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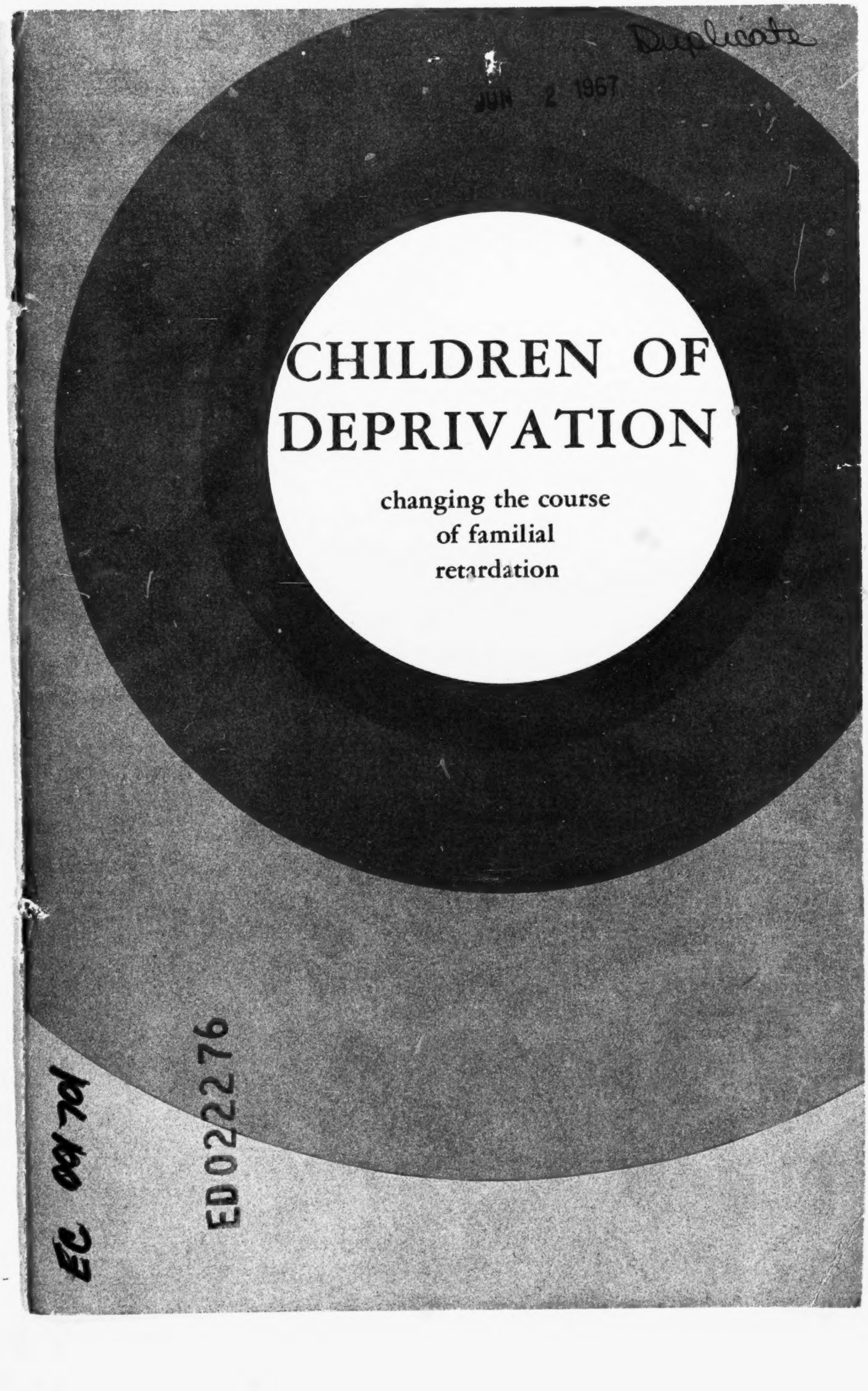
The growth of preschool familial retarded children was recorded, and attempts were made to alter the course of their development. Of lower socioeconomic class, the 16 subjects aged from 3 to 6, had IQ scores from 50 to 84 and no neurological deficits. One or both of their parents and at least one sibling were mentally subnormal. The subjects and 21 of their 93 siblings attended an experimental nursery school for 1 to 3 years. Intervention consisted of medical and dental care, psychological evaluation, training of mothers in nutrition and food preparation, and structured social interaction among mothers. Medical diagnoses revealed that children were retarded partly because of mild encephalopathy, partly because of psychosocial factors, and frequently both. Over the course of the project, the growth rate of the children (who were 81% below average in weight and 84% below in height) ranged from 0 to 24.4% partly due to increased nutritional intake. Although 32 of the children attending the school gained some in IQ, the group with normal electroencephalographs gained the most. Group meetings gave the mothers a feeling of belonging and were more successful than sewing classes. (JZ)



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changing the course of familial retardation

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CHILDREN OF DEPRIVATION

changing the course of familial retardation

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FOREWORD

Many mentally retarded children have the diagnosis of "cultural familial retardation." They come from families suffering from social, economic, and educational deprivation. This type of retardation raises important questions about heredity vs. environment—questions in which social and medical scientists have been interested.

The Children's Bureau has long been concerned with mentally retarded children and has searched for ways in which the problems of the mentally retarded child and his family could be avoided, alleviated, or overcome. CHILDREN OF DEPRIVATION is a report of a 5-year project carried on at the University of Iowa. The project, financed in part by the Children's Bureau and the National Institute of Mental Health, had two major purposes. The first was to record in detail the growth and development of a group of children with familial mental retardation; the second, to attempt to alter the unfavorable course of their development by enriching many aspects of their individual lives, their homes, their schools, and their communities.

A group of retarded preschool children were provided with a nursery school experience, accompanied by extensive services to them and their families. The children were selected on the basis that their retardation was not due to apparent organic cause, at least one of the parents was also mentally retarded, and the family was from a low-socioeconomic group.

Evidence from this project, antedating as it does some of the present poverty programs, points up the importance of intensive work with the whole family—providing better housing, securing stable employment, improving health of all members of the family, and upgrading the educational experiences of the individual.

We hope this report of the Iowa project will be encouraging to those already working on programs to help environmentally deprived children and will stimulate further concern with this cause of mental retardation.

Katherine B. Oettinger

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WELFARE ADMINISTRATION

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chapter 1

FAMILIAL MENTAL RETARDATION - WHAT IS IT?

The type of mental retardation frequently referred to as familial, primary, cultural or simple is generally thought to have no neurological basis but to be the result of psychosocial, economic, and educational deprivation (1,2). However, some investigators believe that there is always a minimal but definite brain disorder which, when coupled with adverse social, educational, and psychological factors, produces the syndromes of familial mental retardation (3,4). This kind of retardation is usually found throughout a family group, is thought to be confined to the lower socioeconomic class, and is thought to comprise a large part of all mental retardation.

As investigators have begun to scrutinize the condition more closely, a growing awareness has developed among them that familial mental retardation, once considered a single category, should be divided into several different subgroups. Many subject areas are thus involved in the study of familial mental retardation. From its inception, the project described in this report relied on many disciplines. Although the project was housed in a medical setting, the planners knew that any narrow definition of scope would greatly reduce the significance of the whole undertaking.

The project was undertaken in 1957 by the Child Development Clinic in the Department of Pediatrics and the College of Education of the State University of Iowa in Iowa City. In addition to support from the University of Iowa, financial assistance was provided by the Children's Bureau, through the Division of Maternal and Child Health, Iowa State Department of Health; by the Division of Family and Children's Services, Iowa State Department of Social Welfare; and by a grant from the National Institute of Mental Health.

The study was projected on a 5-year basis with two major purposes: first, to record in detail the growth and development of a group of children with familial mental retardation; and second, to attempt to alter the unfavorable course of their development by enriching many aspects of their individual lives, their homes, their schools, and their communities. At the beginning of the study the disciplines of medicine, psychology, education, and social work were involved. As the study progressed, it was apparent that there were certain facets in the lives of the children and families which were not being observed. Consequently, in 1959, the disciplines of speech pathology, dentistry, public health nursing, and home economics were added to the study. The project as a whole was concluded in 1962.

The results of this study must be considered in the light of previous study and thought on the subject of familial mental retardation. Certain historical factors and scientific concepts, not necessarily related, stand out as having been particularly important in contributing to the notion that familial mental retardation is a discrete and definable entity. On reviewing what has been written on this subject over the past 100 years, one is struck by the conflicting statements regarding mental retardation. The following empirical and descriptive approach used by Browne (5) was typical for 1862:

"In passing through an asylum I saw five odd and apparently aged men, seated together around a table and apart from the other patients. They smiled; spoke a few words; gabbled or jargonized.

"They were the children of poor but industrious and self-supporting parents, who were somewhat eccentric, and believed to be cousins, or related. They are all, in different degrees, imbecile, ineducable, irresponsible, and incapable of guiding or maintaining themselves."

Despite the poor methods for study of the mentally retarded, there was a wave of optimism in the late 19th century. Statements such as those by Bishop (6) are typical: "Too long has the treatment of the defectively developed mind been postponed beyond the age of infancy, and often are individuals thus affected relegated to the hopelessly idiotic group, without a careful study of the possibilities of each."

Following the introduction by Binet of a test of intelligence in the early 1900's there was a quickening of interest in the subject of mental deficiency. At about the same time Tredgold (7), Davenport (8), Goddard (9), Stowell (10), and others developed schemes for classifying the mentally subnormal. In each scheme there was one category whose members were regarded as the dregs of humanity. Their affliction was variously termed endogenous mental retardation, familial mental retardation, "garden variety" mental retardation, or primary amentia.

Around 1900, the papers of Mendel were rediscovered, and a great flurry of interest in genetics ensued throughout the scientific community. This caused investigators to see many disorders in terms of Mendelian principles. Authors of diverse backgrounds pointed out, sometimes in elaborate and graphic detail, that not only did mental retardation exist in families but it followed a precise Mendelian pattern of inheritance.

As a conclusion to the description of the Juke family, Davenport (8), writing in 1911, stated, "Nevertheless there are laws of inheritance of general mental ability that can be sharply expressed. Low mentality is due to the absence of some factor, and if this factor that determines normal development is lacking in both parents it will be lacking in all of their off-spring.

"Two mentally defective parents will produce only mentally defective off-spring. This is the first law of inheritance of mental ability.

"Thus, in the same environment, the descendants of the illegitimate son of Ada are prevailingly criminal; the progeny of Bell are sexually immoral; and the off-spring of Effie are paupers. The difference in the germ plasm determines the difference in the prevailing trait."

Davenport went even further and concluded that imbecility could be related to our animal ancestry. "And just as the heavy coat of body hair can be traced back generation after generation until we cannot avoid the conclusion that these hairy people represent a human strain that has never gained the naked skin of most people, so imbecility and criminalistic tendency can be traced back to the darkness of remote generations in a way that forces us to conclude that these traits have come to us directly from our animal ancestry and have never been got rid of."

In 1912, Goddard (11) described his famous Kallikak family—the descendants of a Revolutionary War soldier. This study did much to prejudice thinking against the mentally retarded for over a generation. Indeed, traces of this prejudice are still found among individuals with presumably scientific training, as well as among the general public. Since this study has had such great influence, it may be well to review Goddard's conclusions and to study the methods whereby he came to his conclusions:

"Some readers may question how it has been possible to get such definite data in regard to people who lived so long ago. A word of explanation is hence in order. In the first place, the family itself proved to be a notorious one, so the people in the community where the present generations are living, know of them; they knew their parents and grandparents; and the older members knew them farther back, because of the reputation they had always borne.

"We may now repeat the ever insistent question, and this time we indeed have good hope of answering it. The question is, 'How do we account for this kind of individual?' The answer is, in a word, 'Heredity,'—bad stock. We must recognize that the human family shows varying stocks or strains that are as marked and that breed as true as anything in plant or animal life."

Goddard tells us, "When Martin, Sr., of the good family, was a boy of fifteen, his father died, leaving him without parental care or oversight. At one of the taverns frequented by the militia he met a feeble-minded girl by whom he became the father of a feeble-minded son. This child was given, by its mother, the name of the father in full, and thus has been handed down to posterity the father's name and the mother's mental capacity. This illegitimate boy was Martin Kallikak, Jr., the great-great-grandfather of our Deborah, and from him have come four hundred and eighty descendants. One hundred and forty-three of these, we have conclusive proof, were or are feeble-minded, while only forty-six have been found normal."

It is interesting to note that Goddard does point out some exceptions to his firm principle that mental retardation breeds mental retardation. "According to Mendelian expectation, all of the children of Millard Kallikak and Althea Haight should have been feeble-minded, because the parents were such. The facts, so far as known, confirm this expectation, with the exception of the fourth child, a daughter, who was taken into a good family and grew up apparently a normal woman."

To supply a moral for the story, Goddard pointed out, "Martin, Sr., on leaving the Revolutionary Army, straightened up and married a respectable girl of a good family, and through that union has come another line of descendants radically different in character. These now number four hundred and ninety-six in direct descent. All of them are normal people. Three men only have been found among them who were somewhat degenerate, but they were not defective."

Speaking of Martin Kallikak, Jr., and his descendants, Goddard said, "They were feeble-minded, and no amount of education or good environment can change a feeble-minded individual into a normal one, any more than it can change a red-haired stock into a black-haired stock. The striking fact of the enormous proportion of feeble-minded individuals in the descendants of Martin Kallikak, Jr., and the total absence of such in the descendants of his half brothers and sisters is conclusive on this part. Clearly, it was not environment that has made that good family. They made their environment; and their own good blood, with the good blood in the families into which they married, told."

Goddard (9) in his memorable book *Feeble-mindedness—Its Causes and Consequences,* published in 1914, stated in the preface: "That normal intelligence seems to be a unit character and transmitted in true Mendelian fashion is a conclusion that was forced upon us by the figures, and one that is difficult to make agree with previous conceptions.

"The hereditary criminal passes out with the advent of feeble-mindedness into the problem. The criminal is not born; he is made. The so-called criminal type is merely a type of feeble-mindedness, a type misunderstood and mistreated, driven into criminality for which he is well fitted by nature. It is hereditary feeble-mindedness not hereditary criminality that accounts for the conditions."

Goddard's solution to the problem is clear. "We return now to the first part of the eugenist's program—the control by society of the matings of those people who have not intelligence enough to control themselves. It is perfectly clear that no feeble-minded person should ever be allowed to marry or to become a parent. It is obvious that if this rule is to be carried out the intelligent part of society must enforce it." This opinion was also shared by Stowell (10) and Van Epps (12).

Friedman (13) writing in 1915 had other ideas about the cause of mental retardation as well as neurotic disorders. "Nasal obstructions, adenoids, pharyngeal constriction and tonsillar hypertrophies produce mouth breathing, difficulty and diminution of the respiratory function, restlessness and sleeplessness, with anemia, malnutrition, chest deformities, and the general lack of physical development, and are accompanied by neurotic tendencies and mental dullness.

"Phimosis and paraphimosis, in all likelihood in the female as well as in the male, are sources of irritation which militate against the mental and physical well-being of the child.

"Speech defects are largely neurotic manifestations, and are considered stigmata of degeneration; they retard mental development either through a communication of the motor defect back to the brain or through the hindrance to the facility of expression so necessary to liberal mental advancement."

Gradually other voices made themselves heard. Bostock (14) writing on the subject of mental retardation in the 20's said: "Rarely, except in syphilis, infection or injury is the cause recognized with certainty and these cases are uncommon. The wisest course is to look upon the business with philosophy as an accident which might befall the healthiest union. Although heredity and alcohol have received the unenviable distinction of being the princes of blight producers, there are few normal families which on search could not trace an odd suicide, epileptic, dipsomaniac to mar the escutcheon."

Myerson (15) began to refute the work of Goddard; writing in 1933 he said: "When the question of feeble-mindedness is raised, the one thing that has become prominent in the mind of the community through the publications of the past twenty years and more is that it is a menace to the world because it is strongly hereditary, and because the feeble-minded are prolific beyond the normal.

"In this book on feeble-mindedness Goddard decides that feeble-mindedness or the liability to become feeble-minded is a Mendelian trait. He cites some 100 cases, in which family studies have been made in the way discussed before this. Goddard and Davenport are in full accord as to the traits they regard as neuropathic and as to the value of the technique they employ in obtaining their data. The keystone of the arch of their results and laws is the field investigator and her surmises as to the mental and physical state of the dead and the quick; and the cement is the theory that thirty or forty different conditions are neuropathic traits and due to the lack of a unit character.

"Judge how superior the field workers trained by Dr. Goddard were! Not only does their 'first glance' tell them that a person is feeble-minded, but they even know, without a shadow of doubt in so far as the book intimates, without the faintest misgiving, that 'a nameless girl' living over a hundred years before in a primitive community, is feeble-minded. They know this, and Dr. Goddard acting on this superior female intuition, founds an important theory of feeble-mindedness, and draws sweeping generalizations, with a fine moral undertone, from their work. No, I am frank to say that the matter is an unexplained miracle to me. How can one know anything definite about a nameless girl, living five generations before, of whom there can be no records, whom no one remembers, whom no one has seen?

"In ethics two wrongs do not make a right, and in science a thousand instances of guess work, intuition, snap judgements, and hearsay will do good neither to the Mendelian theory nor to eugenics."

The assumption that mental retardation was a simple inherited condition was roundly attacked. In 1934 McNeil and Clarke (16) wrote, "For some years past active public propaganda has been carried on, by which our people have been led to believe that mental defect is nearly always inherited. They are told that at least 80 percent of all cases are accounted for in this way. . . .

"The general conclusion appears to be that heredity plays a very small part in the production of congenital mental deficiency, and that its influence in this respect has been very greatly exaggerated."

Popenoe (17) stated, "Intelligence is probably the most complicated and difficult subject that the student of heredity can investigate. Its genetic foundation can hardly be conceived except as resting on the interaction of many thousands of genes. The fact that it is distributed in a normal curve indicates that the effect of these genes is in a general way additive, probably with the environmental additions also." This attitude can be found elsewhere (18,19,20).

Penrose (21) in 1954 discussed the whole question of genetics and intelligence, considering the problem in relation to mental deficiency. He pointed out that there seem to be four main statements which can be made about genetics and intelligence. First, certain specific diseases appear to be gene-determined and are often accompanied by mental deficiency, such as phenylketonuria and amaurotic familial idiocy. Second, there appears to be a fairly constant relation between the intelligence of parents and children. However, there is a tendency for the intelligence of children to regress toward the mean, and fourth, there tends to be a greater variation in the children's intelligence than in the parents.

Penrose added, "It must be mentioned, however, that concentration of disease in a family can also be produced by adverse environmental factors common to members of the family group. . . .

"Familial concentration does not . . . prove hereditary causation, for, in congenital syphilis the chances of finding the disease in near relatives are much increased, although in the Mendelian sense, syphilis is not a hereditary condition at all."

Certain investigations conducted on children who had been raised in unfortunate circumstances constitute still another influence on thinking, even though many of these studies were originally predicated on hypotheses having little or nothing to do with mental retardation per se. A considerable body of information can be found to suggest that environmentally and culturally deprived children may, indeed, be mentally retarded, as noted in the studies of Harms (22), Skodak (23), Skodak and Skeels (24), Clarke and Clarke (25,26), Bowlby (27), Ainsworth (28), and Spitz (29).

Clarke and Clarke (26) reported a study of IQ changes in the certified feebleminded. This study began with the observation that among a group of 18 adolescent and young adult patients there had occurred in some cases quite large increases in IQ on the Wechsler Test, after a time interval of about 18 months. These changes ranged from a decrease of 5 to an increase of 25 points upon retest, with a mean increase of 9.3. A control group of 18 patients, all new admissions to an institution, was matched with the first group for initial IQ and age, and retested after a time interval of only 3 months, in order to determine the maximal effect of test practice, errors of measurement and underestimation at the first test. It was found that an average increment of only 4 points occurred under these conditions, a significantly lower increase than that shown by the first group.

Having shown that IQ increments occurred in a large proportion of the certified feebleminded and that these increases were associated with early deprivation, this research pointed to the need for investigating how such relatively spontaneous changes can be both accelerated and improved.

Earlier, Goldfarb (30) had noted that retardation was associated with deprivation: "The life histories tend to confirm the previous conclusion that infant deprivation results in a basic defect of total personality. This defect manifests itself in the spheres of intellect and feeling in a manner suggesting that the institutionalized child's personality is congealed at a level of extreme immaturity."

Harms (22) had also conducted a study to investigate the mental development of children with known inferior social histories who were placed in adoptive homes in infancy and to consider the relationship between the mental development of the children and factors characterizing the true and adoptive parents. Three groups of children were studied: One group of 87 whose mothers had intelligence quotients of 74 or less; a second group of 111 children whose fathers were unskilled or slightly skilled laborers; and a third group of 31 children who were included in both of the above groups, their mothers being mentally retarded and their fathers in low-paid occupations.

From the Harms study the following general conclusions can be drawn:

1. Children of mothers with low intelligence or fathers with low

occupational status or from a combination of both, placed in adoptive homes in infancy, attain a mental level which equals or exceeds that of the population as a whole.

2. The frequency with which cases showing mental retardation appears in this group is no greater than might be expected from a random sampling of the population as a whole.

Skodak and Skeels (24) studied a group of children who were placed in an adoptive home before the age of 6 months, and concerning whose natural and adoptive parents some information, though of variable amount and reliability, existed. They showed that the above-average mental development of the children adopted in infancy was maintained into early adolescence. No large-scale decline in IQ either for the group or for large segments of it occurred, although certain children showed either wide fluctuation or a steady decline or rise as compared with the first test results. The intellectual level of the children in the study remained consistently higher than would have been predicted from the intellectual, educational, or socioeconomic level of the true parents, and was equal to or surpassed the mental level of grown children in environments similar to those which had been provided by the adoptive parents.

The information which these authors and others have presented and the conclusions which they have drawn from their data have caused many people to note the importance which certain adverse psychological and social factors may have in preventing optimal development of the child. From such studies has come the belief that no neurological deficit is to be found in the person with familial mental retardation, although the evidence for this is meager or lacking altogether.

The older notion of mental deficiency as a permanent characteristic is gradually giving way to the thesis that mental retardation is a symptom which, like any symptom, could be transient. While there has not yet been a reconciliation between investigators who are primarily environmentally oriented in their conceptualizations (31–35) and those who are biologically oriented (36,37), the victims of cultural familial mental retardation will most probably turn out to be no homogeneous group of individuals, and the condition will probably be shown to be caused by multiple interacting factors. Anastasi (38) observes, "The more precisely heredity and environment are defined and the more fully their operation is investigated, the more evident it becomes that they are inextricably intertwined. The very distinction between them no longer appears as sharp as it once did."

It is interesting to note that in the Report of the President's

Panel on Mental Retardation (39), considerable attention was given to cultural familial mental retardation. In several places in that report, it is suggested that this problem has long been neglected by both the scientific world and the world of social affairs. Since it is generally conceded that persons with cultural familial mental retardation constitute a large group—perhaps 20 percent (40,41,42) of all mentally retarded individuals—there certainly is ample justification for urging that more study be undertaken.

Study of familial mental retardation has thus evolved from simple assumptions toward more openminded, scientific approaches that consider the range of influences on human development. Cathcart (43) has also noted the "change from the optimism of the middle part of the 19th century, through the pessimism of the later years and the early part of this century, to a realism marked by a readiness to learn more about the challenging field of mental retardation." The project reported here, limited as it was in size and scope, embodied this new outlook in its multidisciplinary activities and services, selection of subjects, and application of objective measurements.

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chapter 2

THE PROJECT

As noted in the previous chapter, the study had from the outset two basic purposes:

1. To learn as much as possible about a group of children with familial mental retardation and their families, from medical, psychological, social, and educational points of view.
2. To see if, with an intensive program of environmental enrichment, the course of depressed intellectual development could be modified in these children, who would be between the ages of 3 and 6 when admitted into the project.

Setting

Staff

The staff who studied these families over the period from 1957 to 1962 included pediatricians, dentists, educators, psychologists, speech therapists, social workers, public health nurses, and a home economist. A multidisciplinary approach was considered vital to the effort to offset the various types of environmental deprivation considered to be present in these families. The home economist joined the staff in 1958 for 2 years. This interval of the study, 1958–60, was referred to as the Family Life Study and was the most intensive and productive portion of the study, not only so far as data collection was concerned but also from the standpoint of direct help to families. A short report of the work of the home economist with the families has been published elsewhere (1). An extensive description of the educational setting and activities of this study has also been published which gives a graphic picture of the exceedingly important contribution of this part of the study toward understanding these children (2).

Selection of subjects

The subjects for the project were selected on the basis of the following criteria derived from the literature:

1. Chronological age of an index child between 3 and 6 when first accepted into the study;
2. IQ as measured on the Stanford-Binet Test between 50 and 84;
3. The child's family in the lower socioeconomic class on the basis of the modified Warner Index of Status Characteristics (3);
4. One or both parents regarded as mentally subnormal on the basis of a Binet or Wechsler IQ below 84;
5. At least one other sibling considered mentally subnormal on the basis of a Binet IQ below 84;
6. No gross neurological finding present to explain the child's retardation.

Using these criteria, 16 index children, their 93 siblings, and the 32 parents were selected from the Iowa City area for this study (Table 1). The ages of the subjects in 1957 are shown in Table 2 and the initial range of IQ is shown in Table 3.

As a part of the study, the 16 index children and 21 of their siblings, or a total of 37 children, attended an experimental school for 1–3 years. The most complete data were on these children. Because of several difficulties, the total group of 141 individuals were studied with various degrees of thoroughness. Some individuals were never located and hence were known only by old records.

After the staff described the type of child they wanted to various agencies and individuals, possible subjects were referred by the county welfare department, local physicians, the Visiting

Nurse Association, the special education consultant for the community school system, and by the families already participating in the study. The subject and his parents were first interviewed in their own home by the educator associated with the project. This preliminary interview served several purposes. It was used as a screening device to select those children who appeared to be likely candidates for the school. In addition, it was used to inform the parents of the research aspects of the study, to see if they were interested in having their child attend this special school, and to secure their cooperation. If the child and his parents appeared to fit the criteria established for the study and were willing to cooperate, they were asked to come to the Child Development Clinic of the Department of Pediatrics at the University of Iowa for more definitive study.

When it was determined that no gross neurological deficit was apparent in the child, on the basis of a brief physical examination and the child's medical history, and that his measured intelligence on the Stanford-Binet was 84 or less, he was admitted to the study. All available medical records, including the records at birth, were scrutinized and the medical histories were checked on at least three different occasions in order to minimize discrepancies in the data. The children were examined critically each year for minor neurological deficits.

The families proved to be very difficult to motivate. Initially the staff had the impression that by offering complete medical coverage the families could be induced to come into the project and to stay with the project. This proved not to be the case. For the most part these people were crisis-oriented, so that if their child had what to them was a major problem, such as a fever of 104°, they would bring him to the hospital outpatient department for treatment. Not until later in the project were they able to see much value in preventive medical and health supervision. Of much greater importance was the fact that their children would be away from home. School as an educational experience was not valued or understood by this group; rather it was an opportunity for the mother to receive some relief from the constant care of a young child. At first the parents did not really understand that a school was part of the project. They raised few questions about what this experience would be.

Some families who initially seemed to meet the criteria for the project were not accepted because they were too suspicious of individual staff members. They were fearful that some one of the staff would turn out to be a kind of social welfare or police informer who might recommend that the child be taken from them. The threat of having their children removed from them by court action seemed to be a constant fear of many families. Even as staff members became better acquainted with the families, there was always an aura of this concern.

The staff responsible for the school needed to have a certain number of children in each class. Consequently, some children were accepted into the project who did not meet all of the criteria listed. There were some children who were taken into the project because the parents would not permit a sibling who did meet the criteria to be accepted unless the staff would agree to take the other child as well.

At the beginning of the study consideration was given to having a control group of children. Because of the difficulty in obtaining a sufficient number of children for the study who met the criteria, the staff realized that it would also be very difficult to obtain a control group matched on even such simple variables as age, sex, and level of IQ. Iowa City is small (30,000), has long been influenced by the University, and generally enjoys a high standard of living. Many lifelong residents of Iowa City were surprised to learn that they had slum areas. Since there were not a great number of lower class families, the choice of subjects for this study was limited.

An attempt to secure a control group in Des Moines was planned, and initial efforts to identify a control group were carried out. Unfortunately, this part of the study had to be dropped because of lack of staff and funds. The few families contacted in Des Moines showed little interest in being part of the study if it meant that no help, as they conceived of it, would be provided. Appointments were made for some of the children for examination in one of the Des Moines hospitals, but the families seldom kept these appointments, again illustrating the difficulty in motivating many lower class people to cooperate in this type of study. A great deal more staff time than was available would have been needed to carry out a control phase.

The families

In 1958, the 18 children who were then in the project were from nine families. Only two children were without siblings who were or had been enrolled in the project. These families all met the criteria of the project. All of the mothers participated in the Family Life Study. By 1959, it was necessary to add children to the experimental school to replace those for whom a public school was appropriate or those who had moved away from the county. Consequently, four families were added.

During the second year of the Family Life Study, two children were included whose mother was deceased but who otherwise met the criteria. These two children were living in a middle-class situation with their father, uncle, and aunt. Another child, who entered the project in the fall of 1958, was taken into custody by the court in 1959 and placed in a foster home. The family constellations in the whole project are presented in Table 4 and Table 5. The average number of children per family was 6.8.

The parents had differing attitudes about having more children. Four of the 12 families in the study had babies during 1958–60. These additions meant the fifth child for two families, an eighth and a tenth child in the other two families. Each of the project mothers was fearful of becoming pregnant; they stated that they did not wish additional children. If they did become pregnant, they accepted the fact with stoic resignation.

After pregnancy and birth, all mothers except those of the Catholic faith were offered birth control information and devices by the attending physician. This information was accepted with good intentions. Shortly after returning home, however, the women began to complain because their husbands did not wish any part of it. Many of the women wished to be made sterile or to have their husbands made sterile. The husbands did not wish to have the simple operation performed upon themselves, but they had no objections to their wives undergoing the more extensive surgery. It should be noted that it was difficult for a man or a woman to secure legal permission in Iowa to have such an operation performed unless there was an unusual medical reason. These families, then, went on producing children they had difficulty in caring for and often did not want. Nevertheless, a new child seemed to be accepted to the same extent as the others.

The women, while inadequate in carrying out accepted procedures for child rearing, appeared to love their children as babies, as evidenced by caressing and fondling. As the child reached school age, the mothers resorted to slapping and yelling at the youngsters in order to discipline them. This disciplinary action seemed to be ineffective and gradually they lost control of the children. Often, as the child reached adolescence, the mothers' attitudes changed again, and they seemed to accept the child as a peer, expecting him to carry the responsibilities of an adult.

Formal education for the parents had been sporadic and meager. Only two had finished high school; the mean attendance for the men was 7.7 years, and for the women, 9.0 years. The older siblings of the project children left school as soon as possible after meeting legal requirements. The Lawrence* family was an

*Fictitious names are used throughout this report.

exception. Mr. Lawrence had attended school for only 3 years and was one of the fathers who participated in a vocational rehabilitation program. Although he could neither read nor write, he insisted that all of his older children finish school, regardless of the fact that they disliked school intensely. This family was struggling hard and was taking advantage of all that the community had to offer to move themselves into a better position. The mother and father were both exceptionally cooperative and dependable in the project.

Table 6 shows the type of employment and amount of income of the project families. About half of the fathers had difficulty in staying with the same job for one reason or another. Most of the mothers were not gainfully employed. Only two of them had worked outside of the home for any length of time despite their need for extra income. This was partially due to their having young children, but also to being poorly motivated or being unable to find employment and stick with it.

The family incomes varied from $1,500 to $5,200 per year. The average income per family member was $11.31 per week. (These figures do not apply to the foster-parent families.) Most of the fathers were unskilled laborers. Three were in poor health, which interfered with their job performance. Two of these men were accepted for vocational rehabilitation. Mr. Lawrence enjoyed it and benefited from this help, while the other man, Mr. Olson, was not happy with it, and said he had two heart attacks after he started his training. Four of the fathers were unable to hold a job regularly. Two others were heavy drinkers. The drinking did not seem to interfere with their work but it did affect the support of their families—the men were divorced by their wives during the study period.

Intelligence tests were performed on most of the parents in the project (Table 7). The mothers' range of intelligence, using the Wechsler Adult Intelligence Scale, was from a low IQ of 53 to a high of 108, the mean being 82. These results were important in planning the work that was to be done with the mothers. The fathers' IQ data were less complete but had a range of 71 to 100.

Early in the study an important characteristic of these families became apparent. They were lonely people. Isolated from the community and its affairs, few attended church and none with any regularity, few had friends, and none belonged to a club or PTA.

With few exceptions, these families were at the bottom of the social structure. They had greatly limited resources, low intellectual capacities for the most part, low income, little education, poor physical health in some instances, and little community support. Crises in these families tended to be catastrophic. Crises came often to these people, and, superficially at least, they seemed to accept them stoically. It was amazing to watch them survive their troubles and come up again just in time to be jolted by another of life's vicissitudes.

The homes

Very few accurate descriptions of the physical environment of lower class people are found in the literature. The Davis and Havighurst Study (4) comes as close to depicting a true picture as any. The working class, as depicted by the U.S. Department of Labor (5), includes these "hard-core" families. As they are a minority, the true picture of their circumstances is lost in statistical analyses. The U.S. Department of Labor's description of the 1905 laborer's family was more nearly like that of the present circumstances of these deprived people.

The project families in Iowa City lived in various locations, for the most part on the outskirts of town. Adequate living quarters were difficult for them to find. Iowa City had a high rent scale because of a housing shortage caused, in part, by the increasing number of students in the University. There was no large slum area. The families were forced to take whatever they could get, which usually meant either an older, large but obsolete, farm home on the edge of town or a small rundown home within the city limits. The farm homes were often too large and too far out from the city, which added to their financial problems because of the high cost of heating and the cost of transportation. The shacks in town were small, poorly built, and lacking in adequate sanitary facilities. Table 8 summarizes these data.

The families were not satisfied with their housing and moved fairly frequently, although never finding homes appropriate to their needs. They moved up the housing scale when circumstances permitted. The following are excerpts from two of the mothers' responses to the question, "What would your dream house be like?"

Mrs. Olson (mother of six whose husband was afflicted with psychosomatic ailments): "I would like a long ranch-style house, all on one floor, about four bedrooms and a bath and a half. Lots of windows, and all of my bedrooms to have two closets in them and built-in dressers in them. My living and dining room together; a fireplace in my living room. In my kitchen I would like all steel cupboards and twin sinks, and a new refrigerator, electric stove, and deep freeze. And a Westinghouse washer and dryer, and gas heat, and a full-size basement."

Mrs. Lawrence (mother of eight, husband unemployed because of illness, and unable to read or write): "I would like an 8 or 10 room house with big rooms and lots of windows, also lots of closets—two stories, with well-lighted stairway, a huge basement, sectioned off fruit cellar, and washroom. Would like a closed-in sun porch, also a well screened porch for summer. Would like my house to have a closet at one entrance for coats and such. I would like all inlaid linoleums in every room, lots of cupboards and drawers in my kitchen. Would also like two bathrooms with tub and showers, and a stool and shower in the basement. My yard I would like to be big with white fencing, and a paved drive or good gravel, double garage with storeroom overhead."

These attitudes were found throughout the group. Their real homes contrasted strongly with these dream homes. The mean number of persons per room was 2.7 and the number of rooms ranged from 2 to 6. During the winter the upstairs rooms, or rooms difficult to heat, were abandoned. More often than not adults and children would sleep in the living areas close to the heater, but none used the kitchen for sleeping quarters. The families who had dining rooms did not have enough dishes and seating space to feed the family at one time. Meals in this case were eaten from kitchen pans or other makeshift dishes. Storage space for food and dishes was inadequate, as was counter or table space. All of the families had stoves using either bottled gas or city gas and electric refrigerators, although some appliances were in poor condition. In three homes there was no running water, which meant it had to be pumped and then carried some distance to the house.

In the bedrooms there were usually at least two children sleeping in a single bed and often two beds to a room. Some were even more crowded. About half of the families did not have sheets, and slept directly on the mattress and in their clothing. The blankets for the most part were dirty, ragged, and odoriferous. Towels were usually old pieces of clothing which were torn up. Closet and drawer space was negligible.

The furniture was not much better than the houses. The living room furniture was usually procured from a secondhand store or was donated, and had been very heavily used. Only three homes had enough furniture for all of the family to be seated at once, and two homes had no living room furniture at all. In one of these, the beds were used for seating, and in the other an oversized dining room set dominated the small living room.

All of the families had a television set of some kind. This could be criticized as an unwarranted expenditure, but it did have some good points. First, it was a way of keeping the children off the streets, at least in their early years, although the choice of programs could be questioned. Second, it also served as a means of helping the mother get away from her bleak existence and gain status with others of her class, which was important.

Three families had automatic washers and dryers. These machines were purchased by payment plans at great sacrifice to the family budget, and in two cases they could not be used part of the time because of inadequate water supply. These appliances must have meant a great deal to these women, because they managed to keep up the payments in spite of their low incomes. The women who had these machines kept their clothing and washables in much better condition than those without machines.

Many children, mountains of dirty clothes, hard water, lack of facilities for a supply of hot water, lack of drying space, and their own inefficient techniques caused many mothers to put off the washing. When they did tackle it, the amount of clothing to be washed was so large that they did a poor job. They often attempted to wash it all in one tub of water and rinse it in even less. Consequently, the laundry emerged fetid and gray. Drying the clothing became even more of a problem in the cold, snowy winter months. The only places for drying were the small living rooms and kitchens. Only two families had usable basements. Thus, with clothing drying, children playing, adults about, food preparation and other activities going on simultaneously, it was no wonder that washing was avoided.

None of the families had rugs or vacuum cleaners. The floors were covered with inexpensive linoleum that soon was faded and torn. Curtains were usually of the plastic variety available at the 5 & 10 cent store. Only two families had a telephone, in spite of the fact that most of them lived some distance from town and had no means of transportation when the men were working.

In these crowded homes, there was little privacy and the children had no place to keep their meager treasures. The philosophy of "What is thine is mine" seemed to prevail. Toys, clothing, and food of one belonged to all. Both girls and boys would take any garment of a sister's or brother's which they wished to wear. This tendency, plus the fact that most of the clothing which they had was the wrong size when purchased or acquired, caused the children to look and probably feel like misfits. They were not well accepted by adults or children in better circumstances. Discrimination against them started in their early life and left its mark.

Methods

Health

Besides the initial physical examinations and study of medical records and history, the children were examined closely each year of the study for minor neurological abnormalities. Electroencephalographic tracings were also obtained on the index children and as many of the siblings and parents as possible. EEG's were taken twice and often three times on all index children and siblings who attended the experimental school.

As part of the Family Life Study, dietary surveys were taken of the families and individual children. The growth rates of the children were also calculated.

Medical and dental care was available to the children without expense to the parents. However, as already mentioned, the parents did not consider this an attractive feature of the study. Only after considerable effort on the part of the home economist and the public health nurse did the attitude toward preventive care begin to change and what improvement there was turned out to be sporadic. The parents and siblings were invited to take advantage also of the services offered by the social worker, public health nurse, and home economist.

Social work

All of the families were seen by a social worker, but some more frequently than others. The initial aim of the study was to have sufficient staff time available to work intensively with all families. However, the number of problems which arose in some families became so great that the social workers had to concentrate on them, thereby neglecting some of the others so far as obtaining information was concerned. The families were all visited at least once a week during the 2 years of the Family Life Study (1958–60). Some of the families were contacted two and three times a week. After 1960, the number of social work hours was curtailed because of other commitments, and some of the families were visited only twice a year.

Education

The experimental school consisted of a single-story barracks-type building, a temporary structure, with two classrooms. In the space available, the maximum number of children that could be enrolled at any one time was 20. In addition to the classrooms there was an area for one-way vision observation which the observers could enter from the outside, unnoticed by the children. Equipment usually found in nursery schools, such as building blocks, paper, crayons, tricycles, wagons, phonographs, books, etc., was available. A toilet facility was located between the two classrooms.

The children attended school 5 days a week from 8:30 a.m. to 2:30 p.m. throughout the year, including an 8-week summer session. Because the children were located all over the city and the resources and the level of cooperation of the families were low, arrangements had to be made to transport the children to the school. Ultimately, this was worked out through a contract with one of the local taxi companies, which picked up the children in the morning and delivered them again in the afternoon.

For the younger group of children the ratio of teachers to pupils was 1 to 6, and for the older group the ratio was 1 to 12. There was always a regular teacher in attendance, but in addition student teachers were utilized at different times.

The basic tenets and methods of a regular nursery school program were utilized. Initially it was thought that the usual nursery school curriculum and the usual approaches would need to be modified for this group of deprived, retarded youngsters. This proved not to be the case—one of the many surprises in this study. The children were soon anxious to take part and enjoy the many types of new experiences which they were having.

Psychological testing and observation

Standardized tests of intelligence (Binet, Wechsler) were administered to each child by one of the psychologists before the child was started in the program. All of the index children and their siblings who attended the experimental school were tested twice a year while attending the school but were tested only once a year after leaving school. Various personality tests were used from time to time to study the children and the adults.

During the time each child was in the experimental school certain observations were made. These included anecdotal records made by the teachers as well as twice-weekly 10-minute observations by other staff members.

Family Life Study

The purpose of the project that was concerned with altering the unfavorable course of mentally retarded children by enriching their environment both at home and at school applied especially to the work of the home economist. It implied that she would seek to develop activities related to the entire family—the index children, their siblings, and their parents, especially the mothers.

The hypotheses that the home economist wanted to test were:

1. The women's housekeeping inadequacies were due more to a lack of knowledge than to a lack of interest in their work.
2. These disadvantaged mothers could be motivated to learn good homemaking techniques.
3. These women could be taught some of the necessary skills for improvement of their home environment.
4. The children, their siblings, and the fathers would benefit as the result of the improved abilities of the mothers.

The Family Life Study was concerned (1) with the families and their environment, and (2) with the children—collection of anthropometric and nutritional data, planning of school lunches, and supplying of clothing if deemed advisable.

The work with the families was introduced on an individual basis. It was carried out mostly with the women because they were more accessible than the men. However, whenever possible, the men were included. To establish a relationship with the families, the mothers were visited in their homes at least once a week.

During these visits it was possible to collect data on budgets, dietary planning, housing, furnishings, and clothing. It was also possible to study the mother's relationships to her family, her interests, abilities and housekeeping problems. Deficiencies in homemaking techniques were usually quite obvious.

The idea of applying a group situation as a solution to some of the needs of the women was an outgrowth of the home visits. Forming the group was not difficult. The idea was suggested to one of the mothers, who was enthusiastic. She brought the idea to a meeting of the experimental school PTA, where it was immediately accepted. The group meetings were planned to help the women overcome homemaking deficiencies, to stimulate them and the younger siblings, and to create a slight feeling of competition among the mothers. As an outgrowth of these group meetings and in response to an expressed need, sewing classes were added to the program during the second year of the study.

As an additional feature, the public health nurse organized a group for some of the teenage siblings in the families. This group, complementing the mothers' group, served to focus on some of the needs of the teenagers and became an important ancillary part of the study.

Nutritional and budgetary information was collected and recorded on all but four families during the first year, and on all but one family during the second year. Nutritional data on the families for a 1-week period were collected twice a year. This material was checked by securing information on meal patterns and food checklists from the mothers. Having found some nutritional lacks, the staff undertook a more detailed nutritional survey of the children during the second year of the study. Dietary surveys, conducted by the same general methods used the first year, were refined and were supplemented by the daily recall method and observations of the children's food intake in school.

School lunches were planned to supplement the home diets of the children. The menus were based on foods prepared for consumption in the University hospital. The food was prepared in the hospital kitchen, transported to the school by the dietary service of the hospital, and served by the school teachers.

Anthropometric measurements of each child enrolled in the experimental school were taken once a month beginning in October 1958, using the Meredith Method (6). As additional sources of information, stature pictures, wristbone X-rays, and head circumference measurements were added in 1959 (7).

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chapter 3

STUDY FINDINGS AND RESULTS

Health

Some of the observations presented here on the health of the project families are in the form of precise biological measurements whereas others are more descriptive. Throughout this section there is an attempt to show the interrelationship among the variables of biological, psychological, and sociological factors which influenced the development of the individual and to a lesser extent, the group. Pertinent information from the literature is also included to help interpret the findings.

Medical histories and physical examinations

From Table 9 one can see that a high proportion of the individuals studied had positive medical findings relative to central nervous system disorders, discovered either from the history or the physical examination. The proportion with positive findings is highest among the index children. Events considered to be significant in the history and noted as positive in Table 10 include several factors such as toxemia of pregnancy, precipitous labor (under 1 hour), prolonged labor (over 24 hours), and anoxia at birth requiring two or more minutes of resuscitation, including the administration of oxygen. Many other items were noted but were not regarded as probably affecting neurological development adversely. Such items would include a history of minimal bleeding and spotting during pregnancy, irritability of the child during the first month of life, high unexplained fever in the first year of life, etc.

As to the significance of anoxia at birth, Knobloch and Pasamanick (1) point out, "Almost all of the medical literature still equates failure to breathe at birth as 'birth injury', inferring that some damage to the brain has occurred as the result of delivery. Generally evidence would suggest that a pre-existing congenital brain defect interferes with the ability of the child to adjust to extra-uterine life and to initiate respiration, and that it is the previously abnormal infant who cannot withstand the acidosis often present at birth and who shows persistent neuropsychologic defect."

Many factors are considered to be possibly related to neurological abnormalities. Stott (2) points out that various noxious agents have been observed to produce neurological defect in certain situations in experimental animals. It is his contention that the studies dealing with abnormal mothering have paid insufficient attention to the many environmental factors which may well be in greater abundance in lower class families and therefore more likely to affect their offspring. Knobloch and Pasamanick (1) in their study found a greater incidence of prematurity and of mental defect in the lower socioeconomic group. They also found a greater incidence of mental retardation in children born during the winter months. They postulate that the increased heat during the summer, when these babies would have been in the early weeks of pregnancy, may account to some extent for this. They found that first admission rates to a particular State school for the mentally retarded were higher for children born in years when the mean temperature was above the median or significantly higher, than for the children born after cooler summers. A study done in Great Britain during the war years of 1940-43 indicates that formations of anencephaly and spina bifida increased during that period. The question of whether mental and emotional stresses upon a population during wartime could be responsible for these congenital malformations was raised.

In this report, the term "positive medical examination" refers to those findings of the neurological examination which were considered to be abnormal. There were, of course, other abnormal findings, as noted in Table 11, in addition to those found in the neurological examination.

Of particular interest among the results of the medical examinations were the minor neurological findings. Difficulty with fine motor coordination, deficiency in alternate motion rate or a coordination defect were generally taken as evidence of minor but definite neurological dysfunction. Only one child had what might be termed a major neurological finding, namely, a head measurement that was at the extreme lower limits of normal, suggesting microcephaly. Another youngster had a coloboma of one eye. For purposes of statistical analysis a child had to have at least two positive findings in order to be recorded as a child with a positive physical examination. For most positive cases, there were three or more.

Although the number of index children was small, the most complete information was available for this group. A relatively high incidence of abnormal findings might be anticipated in the histories and physical examinations of this group of children, but finding 60 percent with either a positive history or positive examination was unexpected. Among the other family members, about whom, unfortunately, there was less detailed information, there was also a high level of positive medical findings. In general, the lower the IQ, the more frequent were the positive findings.

In searching the literature, it was not possible to find what the incidence of positive findings would be in the general population. One would not anticipate that as much as 50 percent of the child population would have an abnormal history and physical examination relative to central nervous system disorders.

EEG patterns

Electroencephalograms were taken of all index children, 49 of the 93 siblings, and 20 of the 32 parents. The findings were striking and were not anticipated. As noted in Table 12, 9 of the 16 index children had abnormal EEG records. Similarly, there was a high incidence of EEG abnormalities noted in the siblings. The results obtained on 20 of the 32 parents were inconclusive; it was difficult to obtain sufficient cooperation from the parents to make this part of the study meaningful.

In general, a figure of 10 percent is accepted as standard for the incidence of abnormal EEG's in the symptom-free population. The studies by Ross (3) of children with behavior problems show that as many as 70 percent have EEG abnormalities.

The various kinds of EEG abnormalities* were not always consistently noted in any particular record. Such abnormalities

*All of the EEG records were interpreted by the same person, Dr. John R. Knott, Professor of Psychology, Department of Psychiatry, State University of Iowa.

as the 14-and-6-per-second positive spikes, as noted in Table 13, were of particular interest. None of the 16 index children in this project had clinical convulsions and only one sibling had clinical evidence of a convulsive disorder.

Numerous workers have sought unsuccessfully to find features of the electroencephalogram which correlate specifically with mental retardation. Gibbs and Gibbs (4) reviewed the sleep recordings of young mentally retarded patients and found a strikingly distinctive pattern which they termed extreme spindles because it appeared as an exaggeration of normal sleep spindles. There is some suggestive evidence that spindles may be initiated by impulses originating in the intralaminar nuclei of the thalamus. It seems possible that extreme spindles may be caused by a destructive or irritative lesion. Possibly the damage to the reticular formation may be responsible for some type of mental retardation.

A positive correlation ($P=0.01$) between the abnormal EEG's and the positive histories and examinations was found, as might be anticipated. There was a greater frequency of abnormal (Table 14) EEG's in the siblings of the index children who had abnormal EEG's, suggesting a familial tendency. Whether or not this has any hereditary implications would be difficult to say from these data.

Kennard (5) observed that in the families of children with behavior disorders, there is a marked similarity in EEG patterns of members of a single family. This similarity is especially obvious in members of a family who are close in age. He found a similarity in the EEG patterns of parents and their children in some instances. He noted similar familial tendencies in the EEG patterns of families of epileptic patients.

Physical development of the children

Physical growth is a reflection of a child's physical, environmental, social and nutritional status. It was, therefore, an important area to be explored in this study.

Many measurements of height and weight have been obtained on normal children, and some data are available for children who are mentally subnormal. Mentally retarded children are a heterogeneous group, even though they are sometimes placed in a separate category of the population (6). Several investigations (7,8,9) have shown that mentally retarded children are below normal in height and weight. Others (10), however, found that the heights and weights they recorded for mentally retarded children were in the normal range.

In a study of 384 cases of mental retardation reported by Van Gelderen (11) dwarfism was very frequent and usually took the form of retarded height with much less or no retardation of skeletal maturation. Striking differences in growth were established which could not be explained by environmental influences, which were the same in both sexes and which depended little or not at all on the age of the child. In cerebral palsy of perinatal origin he found the growth disturbance affecting about equally height and skeletal maturation.

In this study, which attempted to consider only one type of mental retardation, measurements of the children showed that 84 percent were below the average for North American children in height, and 81 percent were below average in weight. For purposes of analyzing growth, the children were divided into three groups because of the varying periods of school attendance. Group I was made up of children who left the experimental school in August 1959 (Table 15). Some of the children in Group I were testing above 80 IQ at the time the Family Life Study was begun. These children were placed in public school classes the following year. Group II (Table 16) consisted of those children who had been in the study for the greatest length of time. Some of these children showed a change in their IQ level, but were underage for acceptance into the public school. They were, therefore, retained in the experimental school until they became of school age. Some others in this category, although of age to attend public school, were not believed able to cope with the experience. Group III (Table 17) was made up of children who entered the experimental school in the fall of 1959 and had not as yet met the criteria for admission into the public school.

Tables 15, 16, and 17 show a quarterly record of the children's heights and weights for the periods of their enrollment in the experimental school and their total gains in height and weight for that period. All but one of the children showed gains in both weight and height for the periods that they were registered in school. It would seem from these data that growth in weight and height is an individual peculiarity, each child with his own rhythm—some slowly and evenly and some in spurts. Losses in weight usually coincided with illness or a traumatic home experience.

Bayer and Bayley (12) have developed a technique for growth rate calculation which is corrected for stature. The child may be observed over a short period of time and his growth rate calculated to provide an index of acceleration or deceleration of growth.

The growth rates as shown in Tables 18, 19, and 20 ranged from 0–24.4 percent. The child who had the greatest rate of growth was above the 84th percentile on the Iowa Growth Chart in both height and weight.

Nutrition

The families. A nutritional study of the dietary intakes of project families was conducted as a part of the Family Life Study. A review of the literature indicated that the diets of people from lower income groups are below the recommended daily allowances established by the National Research Council (13). It was of interest, then, to study the intakes of these families.

During the first year, nine families were interviewed but satisfactory results were obtainable from only five families. During the second year of the study, nine families reported.

A weekly market-order type of survey was adopted for use in this study. The home economist often shopped at the stores where these women did their grocery buying, so that she was able to check unobtrusively on their purchases. She was also able to encourage the women to talk about their meal plans and at times to appear at the home at mealtime. Consequently, it was believed that these market-order lists were quite reliable. This collection of data was repeated at least twice for each of the 2 years, and the data analyzed to determine the nutrient content of the diets (14). The requirements were calculated for each family, using the Daily Recommended Allowances of the National Research Council (15). Information was obtained from each of the families as to their grocery budget, and the cost of the items on the market lists was calculated. It was found that during 1958-59 the cost per person per week ranged from $2.06 to $3.90 (Table 21). During the second year the amount varied from $2.77 to $5.32 per person per week (Table 22). The cost of a low-cost diet for the average North American family of six is about $6.16 per person per week (16). During both years all the families in this study were below this amount.

A survey of household expenditures of urban families made by the Bureau of Labor Statistics in 1950 showed that large families, those with six or more members, spend an average of 35 percent of their yearly income for food. Only two of the families (Table 21) were keeping within this amount at first, but in 1959-60 (Table 22) four families managed to do it. However, one of the families was a tenant farmer and a part of his income was in food. It was not surprising that most of the families spent more than the suggested amount when the size of the family and the mean income were considered. Obviously, it takes a great deal of planning to feed a large family on a small income.

Tables 23 and 24 show how nutrients in food purchases of each family compare with the daily recommended allowances of the National Research Council. These allowances provide a margin of safety for proteins, minerals and vitamins, but not for calories. Mean caloric intake was low both years, with four of the five families being below the daily recommended allowance in 1958 and four out of nine families in 1959. Calcium, iron, riboflavin, niacin and ascorbic acid were low during both years of the study. These data would suggest that the families were not adequately nourished.

The children. The food intake of the children was investigated only during the second year of the study. Many of these children were small for their age, as borne out by the measurements that showed 84 percent below average for North American children in height, and 81 percent below average in weight. The teachers observed that a number of the children arrived at school without having any breakfast. Although poor nutritional status of the children was suspected, gross clinical symptoms were not observed.

Several methods of collecting the data were used. A daily recall was furnished by the mothers for Sunday and a weekday, twice during the year. The mothers also supplied a breakfast and supper recall for the children on two occasions. The teachers were asked to keep records of the milk intake of each child for one week, twice during the year, and they also recorded the amounts of food consumed by each child on at least two occasions. Finally, the home economist observed each child at lunch and recorded his lunch intake twice each year. These data were then tabulated and compared with the National Research Council's recommended dietary allowances. Each child's recommended daily allowance was calculated for purposes of comparison and then the mean of these allowances calculated, as well as the mean intake of the children (Tables 25, 26).

Because of the suspected poor nutritive status of the children, lunch was served to them at noon and milk was supplied in the morning and afternoon. The children were able to have all the milk and food that they could consume at specified times during the school hours. Some consumed great quantities of food and others only small amounts.

In analyzing the diets of the children at home, the range of the caloric intake was from 819 calories per day (or 48 percent of the daily recommended allowance) to 2,403 calories per day (or 141 percent of the daily recommended allowance). The mean caloric intake of the children at home was low. The mean intakes of calcium, iron, thiamine and ascorbic acid were low for the children in the age group 4 to 6 years. The intake of all nutrients except vitamin A was low for the children in the 7- to 9-year age group.

The nutrient intakes of the children when their breakfast and supper meals were supplemented by a school lunch and extra milk supplies were more than meeting the suggested standards when viewed collectively. However, it must be noted that when individuals were considered, even with enough foods available to them some of the children were not getting sufficient ascorbic acid, niacin, thiamine, iron, and calcium.

Changes in IQ

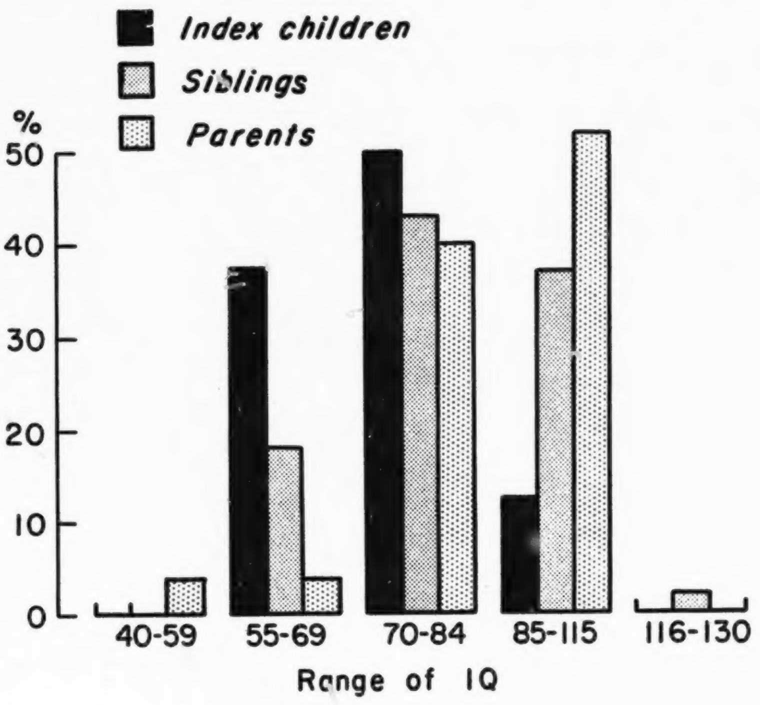
The IQ findings for the project members at the beginning of the study are summarized in Figure 1. Of the 35 children who attended the experimental school and with whom the total staff worked most vigorously, 32 showed some increment in IQ. The data are presented also to show the IQ changes in the group with abnormal EEG's (Table 27) and the group with normal EEG's (Table 28). These findings are depicted graphically in Figures 2 and 3. The interval between the first and last IQ determination was 2 to 5 years. The age noted in the tables was the age at which the child entered the study.

The IQ increments of these children in general were striking, but they were especially so in the younger group of children, and most of all in the 2- to 4-year-old group who had normal EEG's. A mean increment of 23 IQ points was found in that group.

In the group of children with abnormal EEG's (Table 29a) there was a significant increment noted only in the younger children. In the group with normal EEG's (Table 29b) there was a significant increment in IQ (P=.01) in both younger and older children. In combining both the normal and abnormal EEG groups (Table 29c) one still notes the greater IQ increments for the younger group.

figure 1

IQ FINDINGS IN PROJECT MEMBERS
BEGINNING OF PROJECT



Social Interactions

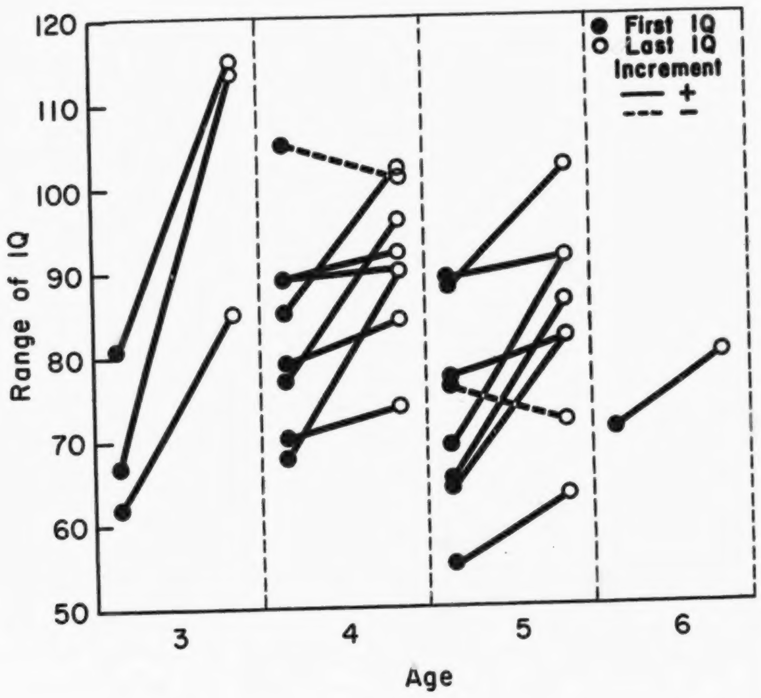
Group meetings

During the early weeks of the Family Life Study, it became apparent that the women had a common problem. They were lonely. They were isolated from the community and its affairs; they had few close friends; they did not attend church; they did not belong to a group; and their children were ostracized at school. This feeling of loneliness permeated the entire fabric of family life. Consequently, the idea of developing a group to meet this apparent need and to serve as a vehicle for imparting useful information was cultivated. It was believed that the group would serve many purposes beneficial not only to the women but also to the younger children (17).

The group during the first year was made up of the mothers

figure 2

IQ CHANGES IN CHILDREN WITH
ABNORMAL EEG'S



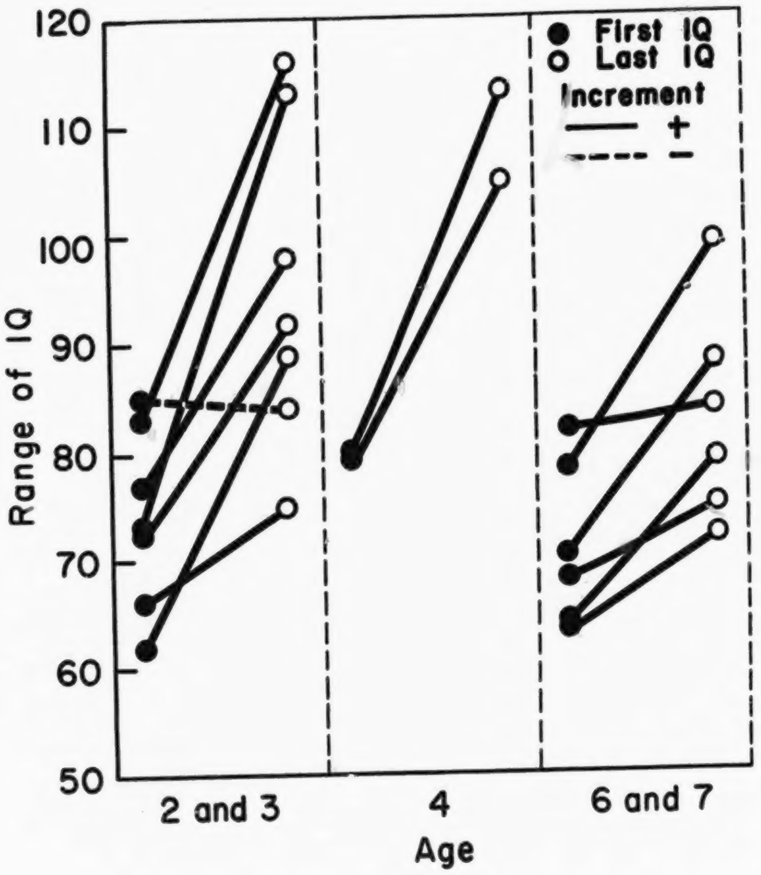
of five families and their 12 children under 3 years of age. During the second year the group contained 11 mothers and 17 children. The two foster mothers did not attend the meetings. This large group created quite a commotion when they were all gathered into a small house; programs which were planned for the group meetings had to take this into account. It was believed that the socializing was important, perhaps more so than any information which might be imparted.

The technique of organizing the group was to remain flexible in order to meet the needs of the women. The plan included the following features:

1. The women and the younger siblings were invited to participate.
2. Meetings were held every 2 weeks in the morning throughout the fall, winter, and spring months ending in May each year.
3. The meetings were held in the home of each family. The woman

figure 3

IQ CHANGES IN CHILDREN WITH NORMAL EEG'S



in whose home the meeting was held served as hostess and a co-hostess supplied the refreshments.

4. Notification of and transportation to the meetings were arranged by the home economist.

5. Attendance was voluntary.

6. Programs for the meetings were planned by the home economist. These were very short, being 15 to 20 minutes in length, and they were planned around interests expressed by the women or around common problems which the staff believed would be best dealt with in a group setting.

The first group meeting was held at the home of a family living in the country. This home was chosen because of its convenient location and the willingness of the woman to have the group. In order to avoid any threat or fear that the women might feel in attending the first meeting, refreshments were furnished by the staff of the project and the meeting was kept simple. The women were given bright colored paints and dried weeds for making winter bouquets. Their response was enthusiastic and exuberant. They wanted to repeat these meetings once a week and bring a potluck lunch so that they could stay longer. However, because the public health nurse and home economist had other commitments, the women were encouraged to limit their meetings to one morning every other week.

Each of the women was eager to entertain and they all had their turn during the first winter. Before each meeting, invitations were sent to each woman and transportation was arranged. The hostess and the co-hostess were visited before the meeting to be sure that they had everything necessary. The women never forgot their turn but often one of them would need help in securing equipment, especially dishes. Whenever possible these items were borrowed from one of the other women, but sometimes the home economist had to supply them. At times it was necessary to supply help in order that the home would be clean enough to suit the hostess. This was usually arranged by asking one of the other women to help. The home economist believed that the women would benefit by using the services of the others in the group rather than those of the home economist. She also encouraged each woman to seek, as much as possible, the answer to her own problem, but she was available in an emergency.

On the morning of the meeting two staff members would pick up all of the women who needed rides and later take them home again. At first, all of them needed to be transported but as they came to feel part of the group they began to make their own arrangements. A ride was always supplied if needed. This was an important part of having a successful group, especially since some members lived in hard-to-reach locations. This transporting also served as a means of collecting information. The women were more apt to discuss their personal problems on the road than at home. If two or more women were in the car, the conversations were likely to reveal their attitudes and problems.

The short program was planned by the home economist and public health nurse on the basis of needs or requests of the women, and a long-term plan was not made. Subjects for the program varied from meeting to meeting—demonstrations of food preparation, sewing and mending techniques, hair cutting and styling, recipe exchange, use of a thermometer, toothbrushing, problems of child care, decoration of quilts for the experimental school, weight reduction, and many others.

The children seemed to profit by attending these meetings. At first they clung to their mothers, but gradually they were reassured and began to play with each other. Only one of the six children who became of age to attend school was eligible for the experimental school. The others all tested above the 84 IQ set as a top figure for inclusion.

The different ways the mothers attended to their children were apparent at these meetings. There were some who yelled at their children and then ignored them, some slapped the child at the least provocation, and others were fearful, constantly alert and watchful. Each of these mothers overplayed her role in caring for her child, i.e., it was either too much or too little in comparison with the manner of the middle class or better educated mother. Their affection and hostility toward their children were not masked, as they may be in the sophisticated parent. The children looked to the mothers for protection when frightened or in trouble, regardless of the manner of discipline.

At one point officers for the group were selected. The women were pleased to be officers in the organization but it was impossible to get them to assume their duties. They could not understand what they were to do and felt and acted embarrassed when they had to perform in their capacity before the other members of the group. Consequently, the home economist assumed the responsibility of a leader. In acting as a leader, the home economist had many opportunities to apply some simple principles of group interaction. She could start a discussion on some problem of the group and retreat, letting the group carry on, then assume leadership again. The group dynamics were quite apparent.

By fall of 1959, after one year of group participation and support, two of the families were attending church regularly and seeing to it that the children had instruction in the Catholic faith. The mothers in the group as a whole still did not feel ready to join a regular PTA, an adult education class, or other organized community activities. They could face the hard looks given them by clerks in the dry goods stores and were better able to stand up for their rights. It would seem that with continued support and group participation some of the more intelligent or well-integrated women could and would advance still further.

Of the various parts of the Family Life Study, the women's group was one of the more successful. It served many purposes: to motivate the mothers to clean up their houses; to give the women a feeling of belonging and being accepted; to stimulate their interest in investigating other aspects of society; to make friends among themselves; to exchange babysitting and clothing; to have a place to tell good and bad news; and best of all, to give them self-respect.

Sewing classes

As an outgrowth of one year of the group meetings and in response to an expressed need of the mothers, sewing classes were added to the Family Life Study during the second year. Plans for these meetings were somewhat different from the group meetings in that they were to assume a more classroom-like structure. The objectives for this project were:

1. To learn basic skills of hand sewing.
2. To learn how to operate the electric sewing machine.
3. To cover and equip sewing boxes.
4. To make a simple blouse or skirt.
5. To learn techniques for repair of garments.
6. To learn how to make over clothing for children and adults.

Two sewing classes were organized, with half of the mothers in each group. A woman in Sewing Class I would volunteer to babysit with the children of mothers in Sewing Class II, and vice versa.

It seemed wise not to serve refreshments, which would divert attention and time from the purpose of the classes. The sewing classes were scheduled so as not to conflict with the group meetings. Like the group meetings, these classes were held in the homes of the mothers, where sewing materials and portable sewing machines were furnished. An assistant to the home economist took charge.

When the mothers were asked what they would like to know about sewing, they invariably said they wanted to learn how to make over garments. In the opinion of clothing construction specialists, repair and remaking are the most difficult of sewing skills and cannot be learned until the basic skills are mastered. This explains why these two techniques were placed last on the list of objectives, even though they had rated highest in the mothers' verbal requests. The women asked to make a simple dress rather than a blouse or skirt. Compliance with this wish was made possible by the selection of very simple dress patterns.

It was hoped that in the sewing class they would proceed through the basic instruction and that some experience could be gained in repair and making over garments. It was evident that in this one year not every woman would be able to achieve all of these objectives.

Eight women started sewing classes in the fall of 1959. During the October meeting all eight covered and equipped sewing boxes. By January, four women were started on the construction of a simple dress and three went on to complete their dresses in the spring.

No specific program of repair and making over was possible because of lack of time. Some instruction was given when problems in repair came up as the women worked on their dresses.

Case Studies

The families in this study were inadequate in meeting many of the problems of life. Many had been clients of the welfare department for years as were most of their antecedents. There was a vicious circle of like begetting like with only a few being able to break away. The problem thus posed was how to develop new methods to stimulate these people to become more adequate in meeting their needs and those of their children. If this could be done, what would be the result? Would these people remain in their niche in the culture? Would it mean that they would be more frustrated than ever if middle-class aspirations were imposed upon them?

To strengthen and fortify these people without necessarily imposing middle-class values was the goal of the staff. The individual approach was the logical one in order to become acquainted with the families and their problems. The social worker who was acquainted with the families accompanied the home economist on her introductory visits to the families. He had previously discussed her visit with them. During this visit the social worker conducted the bulk of the interview, directing it as much as possible to the services which the home economist could offer. In this way she was able to observe the family. All of the families were contacted in this manner. During September 1958 followup calls were made to each home, to search for strengths, to establish rapport, and to discover the needs of the mother concerning home management. Staff conferences were held weekly to note the progress of the children and their families. These meetings were held less often during the second year. The field staff, however, continued to meet frequently and informally to discuss the problems of the families and how they were to proceed.

The home economist was assigned to give special attention to the Cummings, Inman, and Jackson families. Each of the families had their own unique problems in health, social, and home management areas, and each seemed to want help chiefly in home management.

The Cummings family

The Cummings family consisted of a father, a mother, and four children. The parents had finished eighth grade and their declared faith was Catholic. They lived on the edge of town in a small but fairly adequate farmhouse with most of the usual modern conveniences.

The father was an unskilled laborer who received $1.75 per hour for a 40-hour week, amounting to an annual income of $3,120. He enjoyed gardening and helped a great deal with the housework. He was different from most of the other project fathers in that he was overtly concerned with the welfare of the family, particularly his wife.

Mrs. Cummings had both physical and mental handicaps. She had a spastic left arm and leg, with a flexion contracture of her left wrist. Her IQ was one of the lowest in the group, being in the 40-50 range. With Mr. Cummings' support she got along surprisingly well in her household chores, but she was quickly upset, crying easily, and was decidedly underweight.

The three older children were boys. The oldest, 12, seemed to be about the most able member of the family. He attended a country school and was progressing satisfactorily. His mother depended upon him a great deal. He helped around the house and in the summer helped local farmers with their harvesting. The other two boys attended the experimental school. All of the children were small for their age, both in height and weight. The youngest child, 4, was an attractive girl, the "apple of her parents' eyes" and not mentally retarded.

The mother's attitude toward her children was one of pride. She kept them clean and quite neatly dressed, although there were some lapses. She worried constantly about them in small matters but did not seem concerned about long-range goals. She was apt to lose her temper over small distractions and reacted either by severe punishment or tears.

This family had adequate bedding, towels, dishes, chairs, and were one of the two families in the project who had a telephone. They were unwise in their expenditures, especially in relation to equipment for Mrs. Cummings. In 1959 the family purchased a portable electric sewing machine, a new TV set, and on a cold day they impulsively purchased a new parlor stove without investigating the possibility of repairing the old one. Mrs. Cummings also had an automatic washing machine. All of these investments, made with time payments, caused them to run out of money during the spring months, and they were forced to accept help from the county welfare department. While this created a crisis for the family, using the welfare funds did not seem to bother them.

Mrs. Cummings had expressed a desire to learn how to sew. Because of her crippled left hand, it was thought that procuring medical care should be the first step. Consequently, the social worker and public health nurse visited her to explain the advisability of such care. She visited the orthopedic clinic and was fitted with a brace, the usual procedure in such cases. However, she would not tolerate it and insisted that it be removed. She still insisted on learning to sew, and in the fall of 1959 she entered the sewing class offered by the Family Life Study Program. Shortly after the start of the class, Mr. Cummings bought her a used portable electric sewing machine. Mrs. Cummings and her oldest son made curtains for the entire home. The hems were merely turned back once, hiding the raw edge from view, and the curtains were of inexpensive material, but her pride in them was tremendous. She was also able to construct a dress in her sewing class.

Mrs. Cummings asked for help in painting the inside of her house and for information about linoleum for the floors. She was cognizant of the fact that the older linoleum had not worn well and wanted help in choosing an inexpensive, sturdy linoleum. This information was given, and after many visits and much conversation, a red and tan vinyl linoleum was chosen.

The plastic-covered chairs in the kitchen were in very poor shape. After the linoleum was laid, it was possible to direct her attention to the repair of these chairs. Inexpensive plastic material was purchased, and, with the help of Mr. Cummings and the older son, the chairs were re-covered.

Mrs. Cummings was most interested in the group meetings. She wanted to attend them all but at times she needed a great deal of support and encouragement. She would call to report some calamity which, after a few times, the staff understood was an exaggeration and was merely a bid to get a special invitation, apparently to be sure she was wanted. Her attendance was very good. At first she was quite reserved and seemed alone in the group. In order to help her feel wanted her culinary skills were brought to the attention of the other women. She was asked to furnish "kolaches" (a type of Czech pastry popular in the area) for one group meeting and to demonstrate their preparation. The other women in the group were very appreciative. This approbation, coupled with the support of the social worker, public health nurse and home economist, helped to make Mrs. Cummings regard herself as a more adequate person. Mrs. Cummings during these two years became much more active in the church and the family began attending regularly.

At the end of 2 years of intensive service to this family, it would seem that they, and especially Mrs. Cummings, had risen in status in their own eyes. They would still require support and help in many areas, but they were able to ask for help when they needed it. It appeared that this mother needed the stimulation of belonging to a group in order to keep her spirits up.

The young daughter was above the maximum IQ criterion for inclusion in the experimental school when she reached age 3. Whether this was a result of the siblings' stimulation and the mother's greater interest in and understanding of the world about her cannot be definitely stated, but it remains a possibility.

The Inman family

The Inman family was composed of 12 members. Mr. Inman had worked at many jobs but had been employed for the last 7 years as a section hand on the railroad. He drank heavily on weekends and periodically attacked his wife and children. He was usually the cleanest member of the family in appearance, however.

Mrs. Inman was a loquacious, obese and slovenly woman in her early thirties. She was from a lower class home and was 6 years old when her mother died. Her father placed her in a city orphanage at that time, and during her stay there she was placed with many different families who used her as a servant. Her father again claimed her after several years, to help him in his home. During World War II she fell in love with a young man of whom her father did not approve. She was finally persuaded by her father to marry another man, her present husband, a man 10 years older than she. Their life together was a series of crises. Mrs. Inman finally secured a divorce during the spring of 1960, after 18 years of marriage.

The children of this marriage had been wards of the court for several years. At the beginning of the Family Life Study, the two older boys were in State institutions; one in an institution for the mentally retarded and the other in an institution for dependent and neglected children. Later, one of the older girls was also placed in a State institution. The oldest boy, then 18, was returned to the home, which greatly complicated the family situation. Of the other children, one girl dropped out of school at the end of the seventh grade, two girls were in special education classes, and three of the younger children, all boys, had attended the experimental school at some time. The youngest child, a boy of 4, had uncontrollable convulsions, was moderately retarded, and was at home during the period of the Family Life Study but subsequently was placed in an institution for the mentally retarded.

This family was one of the most deficient insofar as their social status in the community was concerned. The father was often in jail for disturbing the peace and the children were scorned by neighbors, teachers, and the community for their unkempt appearance and unacceptable behavior. The mother was accused of adultery and other forms of unaccepted behavior. They were not welcome in churches, and the children were watched carefully when they appeared in a store or at school for fear that they might steal something.

Their home was rundown and situated near the railroad tracks. Inside the home, the furniture was broken, the screen door was hanging by one hinge, and rats and flies abounded.

The living room was sparsely furnished with decrepit furniture; there were no curtains and the floor was dirty and bare. One lone electric light bulb hung from the ceiling, with an extension cord going to the unworkable TV set. Dirty clothes and beer cans were everywhere and an indescribable stench permeated the room. The kitchen contained a large table, a sink with cold running water but a drain which did not work, a gas stove with its handles missing, a washing machine, and a heating stove. Dirty dishes were heaped on the table along with crusts of bread and other leftover food. Spilled and spoiled food littered the floor. The sink was filled with dirty, greasy water and drowned flies. They did not have enough dishes to feed the whole family at one time, so makeshift equipment such as pie pans, aluminum foil, or broken crockery was used. There were only two chairs, both with broken backs.

Although this was a depressing and discouraging picture, the home economist believed that if the mother could be helped to become a more adequate homemaker, all of the family would be strengthened. Home visits were made until rapport was established. As the visits proceeded, it appeared that Mrs. Inman believed she was a good cook and so recipes and preparation of food were discussed. As time went on, Mrs. Inman's innumerable problems of homemaking were revealed.

Her greatest need, from her point of view, was to find a way to stretch the food budget and to pay old food bills. The family had stretched their credit to the limit at a small neighborhood grocery. The visits thus began to take form along planning for low-cost meals and working out market orders. The Inmans had been spending up to $50.00 per week for food. By planning and carrying out the plans, this expenditure was cut to $25.00 per week. Powdered milk and condensed milk were substituted for the more expensive homogenized milk. The food dollar was extended also by taking advantage of sales and buying for a week at a time.

Cutting the expenditures for food from $50 to $25 per week was a drastic reduction which necessitated a change in meal patterns. It was necessary for the home economist to sell this emergency plan to Mrs. Inman and then support her during the family's critical reaction. The selected food, while nutritious, was not as appealing as the more liberal diet. The home economist accompanied her to the market once a week, helped her choose the best buys for the planned menus, and aided her in keeping track of the money spent. These selections were made by cash at a supermarket. With this much support, the family was willing to go along on the "emergency plan" until the grocery bill was paid off.

During this association, other problems, such as cleaning the house, acquiring adequate clothing for the children, budgeting of time and money, came up and were worked out. Progress was slow because more often than not Mr. Inman spent a large part of his weekly paycheck on gambling and drinking before returning home so that Mrs. Inman was left with an inadequate amount to meet the family's needs.

After 4 months of weekly visits, certain changes resulted. The house began to show signs of being cleaned up. Less often were dirty dishes, dirty clothing, food, and beer cans scattered about. The screen door was repaired and the cardboard in the windows was replaced with glass. Eventually, as the time grew near for Mrs. Inman to entertain the women's group, a great fever of activity developed. Mrs. Inman had expressed for several months the desire to fix up her house but it seemed to be mostly a dream. However, in January this dream became a reality. Through a gift fund, paint was provided. The painting done by Mrs. Inman was imperfect, due to the poor condition of the plaster but it helped the appearance of the home a good deal. Inexpensive plastic curtains for both the living room and the kitchen were purchased with some of the money saved on groceries.

During this same splurge of cleaning and painting the living room and kitchen, Mrs. Inman invited the home economist to ask what could be done with the upstairs. Previously plans had been made to assess the wearing apparel of the family and to help plan for future purchases. The home economist took this opportunity to begin both of these tasks.

The upstairs was a repetition, only worse, of the downstairs. The stairway was unlit. At the head of the stairs was a monstrous pile of dirty clothing at least 5 feet tall and spreading out about 5 feet. There were two bedrooms. One contained the lavatory, toilet, a bed and mattress, and one window. The floor was strewn with dirty rags which had been used in place of toilet paper and then thrown on the floor. The other bedroom was lighter and contained one double bed and two single beds. None of the beds had linen and all were filthy. The covers were ragged, consisting of dirty comforts or cotton blankets. Clothes were strewn about over this room as well.

The first step was to sort out the clothing in the large pile. Besides this conglomeration of clothes, boxes stuffed with clothing were stacked about. The answer to the perplexing problem of what had become of all the used clothing given to the family was now obvious. The clothing, worn until dirty, was tossed into this pile or stuffed away in a box. To help Mrs. Inman get her house ready for guests, the clothing was sorted, the usable items washed, and the rest thrown away. Together Mrs. Inman and the home economist made curtains and spreads for these rooms out of some donated material. The home economist then helped with the cleaning of these rooms.

Movement was slow, with much backsliding, during the first year, but during the winter of 1960 things moved more swiftly. After much vacillation, Mrs. Inman divorced her husband, which enabled her to receive money directly from the welfare department. She moved to an adequate farm home just outside the city limits, with hot and cold running water and a bathtub. The house was kept in order. Mrs. Inman was usually quite nicely dressed and kept her hair waved and trimmed. The girls also were improving their dressing habits. They were relieved of neighborhood disapproval and temperamental attacks by their father.

With continued support, Mrs. Inman could probably avoid budgetary and social problems. She showed little sign of backsliding to the slovenly housekeeping of 2 years ago and seemed to have gained insight into the handling and purchasing of food. Without support, however, the prognosis would be guarded.

The Jackson family

The Jackson family was somewhat of an enigma. This family consisted of a father, a mother, and five girls. The father, not too intelligent, was a good semiskilled worker and well paid. He had been orphaned at an early age and had moved from place to place. At 16 years of age he joined the Navy, which he liked. Upon his return from the Navy, he met and married Mrs. Jackson.

Mrs. Jackson was from a family that had often required welfare department support. Mrs. Jackson's mother had demanded much help from her children but gave little of herself. During her school age period, Mrs. Jackson had attended special education classes for mentally retarded children. She was an ambitious, energetic, hard-working woman whose house was usually clean and neat, although she and her girls were often ragged and unkempt. The girls ranged from 7 to 11 years in age. The youngest were twins who were enrolled in the experimental school. The three older girls were in special education classes, although one of them had ability sufficient for regular classes. The children were attractive, usually clean, and well-behaved. The mother wanted to be a good mother and tried to give the girls as much as she could. They had toys, books, Christmas and birthday celebrations, and many experiences not shared by others in the group. The children attended church school irregularly and belonged to the Brownies. One of the girls attended a square dance group.

The home, more substantial than the homes of others in the project, had been partially built by Mr. Jackson. All of the family were proud of it. There were two bedrooms upstairs, each with a large closet, and each of the girls had a cot or rollaway bed of her own. The children's toys were kept upstairs or in a room in the basement. This family had bedding which was kept clean.

The downstairs had a living room furnished with a drab but well-preserved matching upholstered sofa and chair, a TV set, a console sewing machine, a small bookshelf, and an air-conditioner. The kitchen was modern with built-in cupboards, counter space and sink, a fairly new refrigerator, and a stove. The stove was replaced during the first year of the Family Life Study. The parents' bedroom and a partial bath completed the first floor.

Although the house and equipment were middle class, the couple's attitudes conformed more to the lower class. Mr. Jackson had supplied Mrs. Jackson with an ironer, a freezer chest, an air conditioner and an electric console sewing machine, although she did not know how to use them. They were prominently displayed and talked about in Mrs. Jackson's conversations with other women. The closets were full of boxes and racks of donated clothing, but Mrs. Jackson was unable to determine which garments should be kept and which of them should be discarded. Although their income was adequate, they were as poorly clothed and nourished as any of the project families. Mrs. Jackson was unable to read, write, or use numbers effectively and Mr. Jackson was not much better. She could not follow recipes from her cookbooks. She was unable to purchase clothing according to size because sizes did not mean anything to her. She was friendly, a leader in the women's group, but mercurial in her friendships within the group. Mr. Jackson, while adequate in his repetitious job, was rigid and demanding.

The marriage was stormy. Mr. Jackson would not give his wife any money but bought everything which was used in the house without consulting anyone. He was known to slap his wife, and she was sure that he was interested in other women. The marriage followed a pattern of recurring crises.

During the second year of the Family Life Study, Mr. Jackson's work took him to another, larger city, which forced the family to move. This was a terrific blow to Mrs. Jackson who had lived her whole life in a small community. It was difficult to leave the home of which she was so proud. This woman was close to complete disintegration just before and just after the move. However, the field staff continued to visit her at least once a month and the chances of her psychological survival looked better.

Mrs. Jackson was one of the most receptive of all of the group to the services of the home economist. She wanted to improve in sewing, budgeting, cooking and cleaning, and caring for her children. It was difficult to pin her down to the one thing she wanted most. After several visits, she finally decided to learn how to clean more adequately so that she might get some cleaning jobs and make extra money. This was an odd choice considering that the family income was at least $100 per week. The home economist believed that it would be difficult to teach this woman in her own home the techniques which she would need in job situations. Therefore, she was taught in the home of the home economist, where she was proud to learn and worked hard to do a good job.

Each technique of cleaning was broken down into its component parts. These parts were explained and demonstrated by the home economist and then repeated by Mrs. Jackson. This program was continued under supervision for 3 weeks before Mrs. Jackson was permitted to attempt to do the work alone. She asked for criticism after each session and it was given in a direct manner. This was unusual as it was often a problem to offer constructive criticism to these women. After 6 weeks, Mrs. Jackson was beginning to be too dependent on the home economist, so the work was terminated by finding her a position. The reports of her work in the outside situations were good.

Mrs. Jackson was also anxious to have help in preparing her meals. She had learned only a few ways of fixing foods from her early girlhood and these she used with monotonous repetition. Her husband objected strenuously and at times refused to come home for meals. This situation was well hidden at first but ultimately it was explosively revealed, accompanied by tears. Mrs. Jackson and the home economist talked the situation over. Bit by bit the problems of not knowing how to read a recipe, of being unable to follow oral directions unless they were repeated several times, of not having anyone to help her learn new ways, were brought out. Thus, the task began of helping her to plan menus around her husband's likes and dislikes, to read and follow recipes, to prepare new dishes, and, finally to plan the market order for a week. Her husband seemed to be pleased and during the last few months in Iowa City, Mrs. Jackson was allowed to do the marketing. This pattern was reversed after their move, with Mr. Jackson again doing the buying.

Working with Mrs. Jackson involved many areas, because her desire to improve as a homemaker was so intense. She was of help in organizing the women's group and was a strong motivating force for the whole group. She would offer to help the others in housecleaning and would show them some of the techniques which she had learned. Her clean house and her desire for good furniture and attractive decor helped to inspire some of the others in the group. Although she had low measured intelligence, she had assets which were outstanding.

Individual work was done with other women in child care, diet, nutrition, and budget planning but these cases were of shorter duration. The Frosts will serve as an example. Mrs. Frost, a warm, loving, dirty, common-law wife, was criticized by neighbors because of her dirty house and unkempt children. To try to keep this family from being dispossessed, the home economist was asked to help Mrs. Frost. Although much effort was exerted, Mrs. Frost was unable to profit from this help. She and her children were happy, usually had enough to eat, and were warm. What more could they ask? She was always glad to receive the staff and was friendly, but she was not interested in being clean. This family finally moved to a different home in a neighboring small town where they seemed to be getting along reasonably well.

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chapter 4

DISCUSSION OF FINDINGS

The basic purposes of the study, as explained at the beginning, were to learn more about familial mental retardation and to see if environmental enrichment could alter its course. The findings must therefore be looked at in reference to two main considerations: the nature of familial mental retardation, and how it should be managed.

The Nature of Familial Mental Retardation

From this study and from others it would appear that familial mental retardation is not a discrete entity; nor is it found in a homogeneous group of persons. Inasmuch as the project families were all from the lower socioeconomic class, it should not be surprising to find that many more medical ills befell them than might be expected in a comparable number of middle class families.

Pasamanick, Lilienfeld, and their colleagues (1), have reported a series of studies in which a variety of neurological and mental disorders, including undifferentiated mental retardation, have been related to the occurrence of maternal complications of pregnancy. A series of patients with cerebral palsy, epilepsy, mental retardation, behavior disorders, speech disorders, reading disorders, and tics, drawn from selected medical care facilities, were compared with control groups drawn usually from birth certificates, with respect to the frequency of complications of pregnancy noted on the birth certificates or hospital records. For most groups of patients in the study series there was a clear excess of complications of pregnancy compared with the control series.

The study of pregnancy complications suggests that there may be an increase in prenatal damage occurring in infants born of parents with inadequate social adjustment. Complications such as toxemia, bleeding, pyelitis, genitourinary disease and hydramnios have a far higher incidence in the lower socioeconomic groups than in the higher. Likewise, perinatal difficulties, particularly prematurity, are more common in these groups.

The incidence of all types of prenatal disorders found in this study was higher than one would anticipate finding in the general population. A high proportion of the index children (over 60 percent) had some degree of encephalopathy. It seems likely, therefore, that central nervous system aberrations resulting perhaps from prenatal conditions did contribute to the child's subnormal functioning in at least half of the cases. This hypothesis is supported further by the observation that the least gain in IQ was among those children who had abnormal EEG's. Stated another way, one might note that it was possible to mitigate the social and psychological factors to some degree but not the neurobiological ones.

The data from this study clearly show that this form of mental retardation is found in families and therefore it is appropriate to designate this syndrome as familial mental retardation. However, the fact that a disorder is familial does not necessarily mean that it is genetically determined. Syphilis and tuberculosis are often found in families but that association should not be construed to mean that those diseases are genetically determined—a major failing in the past. Existing knowledge of the mechanisms of genetic transmission of chronic disorders such as familial mental retardation, arthritis and hypertension is vague, offering opportunity for speculation but little else.

These youngsters came from homes where many social ills abounded, as any of the case histories will show. Poor housing, poor diets, and, in general, poor environment were usual among these families. It is postulated, therefore, that familial mental retardation may be produced by biological factors, by psychosocial factors, and most commonly by a combination of both. One might also speculate that the combination of biological and psychosocial factors is especially pernicious. Only by further study of such groups will the answers be found, however.

There are some important deficiencies in this study, the most important being the lack of a control group. Although one may argue that a true control population of individuals who are as heterogeneous as these probably does not exist, an effort to control some of the variables would have been desirable. An attempt to secure a control group was made but lack of funds and personnel made it impossible to develop this part of the study.

Another deficiency is that normative data for some of the parameters used in this study do not exist. For example, the incidence of "soft" neurological signs in the child population is not known nor is there universal agreement as to what should be included as a "soft" sign. This fact further interferes with securing a control group. Stating this another way, one might ask, at what age do children normally acquire the ability to perform certain of the fine motor coordination tasks used in this study?

The relevance of the changes in IQ reported in this study must be regarded with some caution, although the pessimism of earlier investigators (2,3,4) seems unwarranted. While there is no implied doubt about the tests, the testers, or the computations, there is concern lest, at this juncture, there be too much emphasis placed on the variations in IQ. Sontag and associates (5), for example, have reported marked variations in IQ which may occur when subjects are followed over a period of time much longer than was possible with this group.

It seems possible that improved IQ may be a manifestation of improved personality development as the result of a changed and presumably improved environment. Consequently, the IQ increments of the children in this study may be a reflection of total personality change occurring through the efforts of school, home and community. The work of Clarke (6,7) would support the contention that any environmental change, other than an adverse one, will offset the deleterious effects on IQ of poor environment, especially if this change occurs early in the child's life, possibly before age 5. The environment should be viewed as having an effect on the total development of the individual, with the IQ representing only one facet of the organism which can be measured with some degree of confidence.

How Should Familial Mental Retardation Be Managed?

The experiences of this study on familial mental retardation indicate that the primary target for change should be the young child. Efforts were made to produce change directly by working with the child and his family and indirectly by trying to alter the environment around him.

The most obvious influence applied directly to the child was that of the school. The educational techniques used in the school were not new; the innovation was largely the bringing of a nursery school experience to a group of children who ordinarily would not have received it. Keeping the classes small, with an adult-child ratio of around 1 to 5, seemed important. In addition, these children were given a variety of extra-school experiences such as being taken to a park, visiting a fire station, and so forth, all of which are the kinds of experiences provided in the usual nursery school program.

Health services were provided to all children. Improved diets were provided for all of the children during the time they were in school. To some extent the diets at home were also improved as a result of the efforts of the staff. The effect of these measures while obviously important was less readily observable.

Even less immediately observable were the important contributions made by the social worker, the public health nurse, and the home economist. To produce change in attitude of the adults of this project was a long arduous process requiring the talents of all of the staff applied in a variety of ways. Some of the success of this project would not have been likely had the effort not been made to work closely with the families. The changes in the families could be gauged only in qualitative rather than quantitative terms. That change occurred was an important factor which, one would believe, made a positive impact on the developing child.

Too often in the past, professional individuals working with such families have become discouraged because they have not been able to see results. The physician who only has periodic contact with an acutely ill child from a lower class family is confronted with the seriousness of the current problem and is unable to make significant headway with the continuing social problems he sees. Similarly the social worker cannot solve all of the problems of the family working only from a social casework point of view.

The teacher also recognizes that her efforts may be thwarted if the social, psychological, and medical aspects of the child's problem are not considered. To social planners, then, the strong suggestion would be made that a greater likelihood of success will be obtained when a combination of forces can be applied to families such as these. Fragmentation of services must be eliminated if significant progress is to be made with this group of families.

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Within the complex of services offered, rapport with the women in the families can be readily established by a woman trained in dealing with homemaking problems. The mothers in this type of family have had little opportunity to develop homemaking techniques, for two reasons: first, their own mothers are usually unsatisfactory models; and secondly, the home economics curriculum of most secondary schools does not prepare them to meet their family's needs. Although such women usually stay in school until they are 16 or have finished the eighth grade because it is demanded by law, they are not receptive to what is being presented. Perhaps more emphasis on homemaking in elementary school might be one answer to this deficit, capitalizing on the high interest younger girls have in cooking and sewing. At the junior high level, greater emphasis on social interaction might help.

By the time these women are married and have families they are again very receptive to information about home economics. However, it must be geared to their level and their needs to be effective. Adult education as now available usually will not work because of the timidity of such women or their hostility to a middle-class teacher and her values. The homemaker program as set up in many States is one device for effectively introducing the desired information and skills. A women's group in a church, led by a woman who is warm and understanding and has some training in home economics or social work, might meet some of the needs of these families. Too often society's obligations to this class of people are discharged by giving them material things, which, necessary as they are, may create a problem in the families by adding to their feeling of inadequacy unless they are accompanied by other services.

Home economists have been trained in many areas of knowledge and skills required to help alleviate the inadequacies of families with familial mental retardation. However, their application of their knowledge and motivation to assist groups such as these have not been cultivated. Home economists are used often as consultants, but rarely have they been encouraged to participate in field work, which should be a challenge to them as well as to the other disciplines working with this group.

It was possible for the home economist in this project to teach the mothers some of the skills of housekeeping. However, if the teaching facilities were withdrawn too soon or if the teacher did not continue to support the mother in her efforts, the mother was apt to backslide. A program such as this should be planned on a long-term basis, providing continued support and understanding of the women's needs.

From the work done in the sewing class certain conclusions seem warranted. In teaching skills to such students, a great deal of individual, repetitive instruction is necessary. Simple descriptive instructions are needed for this kind of a group. The material which was found, including that from the United States Department of Agriculture Extension Service, was too advanced for the women in this group.

It is obvious from the nutritional survey data that these families are poorly nourished; height-weight measurements showed that most of the children were below the averages for North American children. Some method of encouraging better diets or awareness of dietary lacks should be a part of overall planning. Whether or not nutritional deprivation has any direct result in mental retardation of this type is not known at this time, although it can be suspected.

If subsequent studies should validate the findings presented here, there would be room for optimism in believing that significant help can be given to those with familial mental retardation. Perhaps by concentrating efforts to rehabilitate extremely deprived young children, 3 to 5 years of age, one may be able to modify some of the deleterious effects of poor environment, so far as the ultimate intellectual functioning of these individuals is concerned. Ainsworth et al., (8) made this same point some years ago. Certainly the older concepts of mass sterilization (9,10,11), colonization (12,13,14), and the like, were impractical, to say nothing of being inhumane, and do not provide solutions for the masses of individuals similar to those considered in this study.

Conclusion

A partial analysis of 16 lower class families has been presented. Almost half of the members of these families were mentally retarded according to current definitions. The analysis of the data suggests that the children who were regarded as mentally retarded were so in part because of mild encephalopathy, in part because of psychosocial factors, and frequently as the result of a combination of the two. It is, therefore, postulated that familial mental retardation is not a homogeneous entity but is due to many factors, some of which have been discussed.

Although one must view the findings with caution, the data would suggest that by working diligently with this group of individuals, when they are no older than 3 to 4 years of age, one may be able to ameliorate some of the pernicious factors so that these persons need not be condemned to lifelong crippling mental subnormality.

The evidence as presented from this and other studies would suggest that any effort to change the environmentally deprived person must include intensive work with the total family, providing better housing, securing stable employment, improving health of all members of the family, and upgrading the educational experiences of the individual. Unless a total approach is made, it seems unlikely that this massive problem of our society can ever be managed, let alone conquered. One must also raise the question as to whether starting to work with these children at age 3 is not late. Perhaps efforts to reach the child and his family soon after birth should be considered.

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table 1

PROJECT FAMILIES

	Male	Female	Total
Index children	10	6	16
Siblings in the experimental school	17	4	21
Siblings not in the experimental school	39	33	72
Parents	16	16	32
Total	82	59	141

table 2

AGES OF PROJECT MEMBERS IN 1957

		0-5	6-10	11-15	16-20	21-35	36-50	Not known	Total
Index children		12	4						16
Siblings in experimental school	IQ less than 85	14	1						15
	IQ more than 85	6							6
Siblings not in experimental school	IQ less than 85	4	8	9					21
	IQ more than 85	10	5	2					17
	IQ not known	18	10	3	3				34
Parents						19	9	4	32
Total		64	28	14	3	19	9	4	141

table 3

RANGE OF IQ OF PROJECT MEMBERS

	0-54		55-69		70-84		85-115		116-130		Not known*	Total
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.		
Index children			6	37.5	8	50	2	12.5				16
Siblings in experimental school			6	28	10	48	5	24				21
Siblings not in experimental school			5	14	16	42	16	42	1	2	34	72
Parents	1	4	1	4	9	40	12	52			9	32
Total	1		18		43		35		1		43	141

*Not included in percentage distribution.

table 4

NUMBER OF CHILDREN IN FAMILY, 1962, AND NUMBER IN PROJECT SCHOOL, 1958 AND 1959

Family name	No. of children (1962)			Number in project school (1958)	Number in project school (1959)
	Total	Boys	Girls		
Alford	16	12	4	2	3
Batson*	8	7	1	2	0
Cummings	4	3	1	2	2
Dollar	6	2	4	3	0
Edgar	5	4	1	....	2
Frost	11	5	6	....	1
Grant*	7	4	3	....	2
Hobart	6	3	3	....	1
Inman	10	6	4	3	1
Jackson	5	0	5	2	0
Kermit	5	4	1	1	1
Lawrence	8	7	1	....	2
Marshall*	1	0	1	....	1
Nelson	9	4	5	1	....
Olson	6	3	3	2	1
Patterson*	2	2	0	....	1
Total	109	66	43	18	18
Average	6.8	4.1	2.7		

***These families did not participate in the Family Life Study of 1958-60.**

table 5

CHARACTERISTICS OF THE PARENTS, 1962

Family	Age in years		Years in school		Marital status		Participation in Family Life Study (in months)
	Male	Female	Male	Female	1958	1959	
Alford	49	41	8	11	M	M	9
Batson	37	35	?	10	M	D	Non-participants
Cummings	52	43	8	8	M	M	9
Dollar	31	28	7	8	M	M	9
Edgar	36	31	8	10	M	M	9
Frost	45	32	12	12	Common-law	Common-law	9
Grant	50	[a]	7	7	[b]	[b]	Non-participants
Hobart	32	28	7	9	....	M	5
Inman	49	37	8	9	M	D	9
Jackson	34	33	6	7	M	M	4
Kermit	53	34	8	8	M	D[b]	12
Lawrence	44	40	3	9	M	M	9
Marshall	26	?	?	10	[b]	[b]	Non-participants
Nelson	32	29	10	11	M	M	9
Olson	40	34	8	9	M	M	9
Patterson	?	38	11	Special Class	M	M	Non-participants

[a] Mother deceased.

[b] Not applicable; children in foster home.

table 6

EMPLOYMENT AND INCOME OF PROJECT FAMILIES, 1960

Family	No. of children supported	Type of employment	Employment record		Family income per week	Family food cost per week
			Regular	Part-time		
Alford	6	Father-trucker	X		$ 60.00	$ 35–40
		Mother-laundry		X	60.00	
Batson	7	Janitor	X		60.00	30.00
Cummings	4	Unskilled, steamplant	X		70.00	30.00
Dollar	6	Long distance trucker		X	80.00 When employed	25.00
Edgar	5	Tree-trimmer	X		79.00	25.00
Frost	8	Unskilled, construction		X	79.00	30.00
Grant*	7	Lineman, elec. co.	X		80.75	?
Hobart	5	Service station attendant	X		79.00	30.00
Inman	9	Section hand on railroad	X		81.60	40–50
Jackson	5	Foreman, ice cream plant	X		100.00	30.00
Kermit	5	Unskilled, construction		X	79.00	?
Lawrence	8	Unemployed for health reasons			All income from veterans' relief	30.00
Marshall	1	Unskilled		X	ADC	
Nelson	9	Unskilled, construction		X	When employed 75–85	30.00
Olson	6	Unemployed for health reasons		X	ADC	40.00
Patterson	2	Unskilled	X		80.00	30.00

*Children in foster homes; father paid for part of the cost of children's care.

table 7

IQ'S OF PARENTS OF PROJECT CHILDREN (BINET OR WECHSLER ADULT SCALE)

Family	Father		Mother	
	Year	IQ	Year	IQ
Alford	1959	89	1959	91
Batson	estimated to be average		1944	75
Cummings	1959	89	1959	53
Dollar	1960	100	1960	75
Edgar	1960	71	1959	86
Frost	estimated to be average		1956	94
Grant	estimated to be average		estimated mildly retarded	
Hobart	estimated to be average		estimated mildly retarded	
Inman	estimated to be average		1959	86
Jackson	1959	74	1959	70
Kermit	estimated to be average		1959	72
Lawrence	1961	71	1960	108
Marshall	not known		1960	60
Nelson	1960	100	1960	93
Olson	1961	87	1960	80
Patterson	estimated to be average		1959	94

table 8

HOUSING OF SOME PROJECT FAMILIES, 1959

Family	Rent/ month	Neighborhood	Plumbing	Type of heat	Persons per room	Description
Alford	50.00	Slum type	None	Parlor stove	4	House very poor shack.
Cummings	50.00	Country	Yes	Parlor stove	2	House minimal in construction.
Dollar	45.00	Country	None	Parlor stove	2–1/3	This family moved from a 2-room shack to a better home in the country, and then to a large non-modern home in a small town.
Edgar	47.50	City	Toilet, no bath	Parlor stove	2–1/3	Toilet in bedroom. Home considered shack in neighborhood.
Frost	45.00	Country	None	Parlor stove	3–2/3	From a non-modern farm home to a small non-modern home in a small town.
Grant*						A country home, fairly adequate.
Hobart**	50.00	Slum type	Yes	Parlor stove	3–1/3	This could be considered a summer cottage or a river shack.
Inman	47.50	Low-average	Toilet, no bath	Parlor stove	2–1/2	From a very poor, partially modern home in the city to a modern country home.

Jackson	50.00	Low-average	Yes	Central heat	1–3/4	Moved out of the county to a modern home in a larger city, low-average type.
Kermit †	50.00	Low-average	Yes	Central heat	2–1/2	Apartment
Lawrence	50.00	Slum type	Yes	Parlor stove	2–1/4	A run-down home but better than the others in the slum area.
Nelson	80.00	Country	Yes	Parlor stove	2–1/2	Trailer was lost due to nonpayment. They bought another and built a room but will probably lose this also.
Olson	Shared with parents	Average	Yes	Central heat	3–1/2	Moved to a large modern farm home and back to poorer housing in the city.

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*Foster home.

** This family was added in the fall of 1959.

† This family was broken up during the summer of 1959 and the children placed in a foster home.

table 9

MEDICAL FINDINGS RELATIVE TO CENTRAL NERVOUS SYSTEM

	Project members with positive findings								Project members with negative findings		
	+History +Exam		+History −Exam		−History +Exam		Total positive findings		−History −Exam		Not known*
	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	
Index children	5	31	5	31	1	7	11	69	5	31	
Siblings: IQ less than 85	8	20	11	28	1	3	20	51	19	49	
Siblings: IQ more than 85			9	43			9	43	12	57	
Siblings: IQ not known	2	11	9	50			11	61	7	39	15
Parents	4	17	5	20	1	4	10	41	14	59	8
Total	19		39		3		61		57		23

*Not included in percentage distribution.

table 10

EVENTS IN PRENATAL, PERINATAL, AND POSTNATAL HISTORIES OF 94 PROJECT CHILDREN

Type of event	Number of children
PRENATAL HISTORIES	
Trauma	1
Bleeding and spotting	6
Infections	3
Obesity	4
Emotional disturbances	3
Preeclampsia	20
PERINATAL HISTORIES	
Anoxia	10
Breech presentation	8
Birth trauma	3
Abnormal labor	18
Abruptio placenta	1
Postmaturity	1
Prematurity	12
POSTNATAL HISTORIES	
Convulsions	2
Difficulty feeding	1
Erythroblastosis fetalis	3
Incubator care in infancy	11
Retrolental fibroplasia, minimal	2

table 11

FINDINGS OF MEDICAL EXAMINATIONS OF 94 PROJECT CHILDREN

Type of finding	Cases
Infections and minor skin troubles	6
Eye disorders	5
Physical trauma	3
Physical retardation	2
Alternate motion rate of hands depressed	1
Coordination defects	25
Reflex disorders	8
Speech defects	3
Other congenital anomalies	5
Miscellaneous	10

table 12

EEG FINDINGS IN PROJECT MEMBERS

		Normal		Abnormal		No EEG*	Total
		No.	Pct.	No.	Pct.		
Index Children		7	44	9	56	......	16
Siblings	IQ less than 85	18	56	14	44	7	39
	IQ more than 85	11	73	4	27	5	20
	IQ not known	2	100	......	......	32	34
Parents		16	80	4	20	12	32
Total		54		31		56	141

*Not included in percentage distribution.

table 13

ABNORMALITIES FOUND IN 104 EEG'S OF 65 PROJECT CHILDREN

Abnormality	Number
Non-focal slow	6
Non-focal fast	4
Non-focal spike	4
Focal slow	4
Focal fast	4
Focal spike	11
14 and 6/sec positive spikes	14
Wave and spike	3
Asymmetry	4
Paroxysmal	2

table 14

COMPARISON OF EEG'S OF INDEX CHILDREN WITH THOSE OF SIBLINGS

Index children with—	EEG's of siblings with—		EEG's of siblings with—	
	Positive medical history	Negative medical history	Positive medical examination	Negative medical examination
Normal EEG (N=7)	7	10	6	11
Abnormal EEG (N=9)	18	14	3	29

table 15

GROWTH OF CHILDREN ATTENDING EXPERIMENTAL SCHOOL FOR ONE YEAR, THEN PLACED IN PUBLIC SCHOOL

Group I

Child	Age yrs.-mos.	Oct. 1958		Jan. 1959		Apr. 1959		Jul. 1959		Total gains	
		Ht. (cm.)	Wt. (kg.)	Ht. (cm.)	Wt. (kg.)	Ht. (cm.)	Wt. (kg.)	Ht. (cm.)	Wt. (kg.)	Ht. (cm.)	Wt. (kg.)
D 6	4–1	98.4	16.00	99.7	16.00	100.3	16.40	103.5	16.68	5.1	.68
D 4	6–6	108.0	19.30	109.9	19.75	111.8	19.92	113.0	20.43	5.0	1.43
D 5	5–6	103.2	17.25	106.0	17.25	107.3	18.16	109.2	17.98	6.0	.73
F 6	5–5	107.3	17.59	108.0	18.39	109.9	19.07	....	....	2.6	1.48
F 7	5–5	104.8	16.57	106.0	17.25	107.3	17.31	108.6	17.71	3.8	1.14
I 9	7–7	121.9	25.08	124.5	25.65	124.5	28.15	....	....	2.6	3.07
I 10	6–3	....	25.88	118.7	26.90	120.7	28.60	121.3	28.60	2.6	1.70
J 6	7–2	119.4	21.34	120.7	21.57	123.2	22.13	126.4	23.27	7.0	1.93
J 7	7–2	122.3	24.97	122.6	25.42	125.7	27.01	128.3	28.15	6.0	3.18
O 4	6–3	116.8	26.67	120.0	26.79	121.3	27.69	123.2	27.58	6.4	.91

table 16

GROWTH OF CHILDREN ATTENDING EXPERIMENTAL SCHOOL FOR TWO YEARS

Group II

Child	Age yrs.-mos.	Oct. 1958		Jan. 1959		Apr. 1959		Jul. 1959		Total gains	
		Ht. (cm.)	Wt. (kg.)	Ht. (cm.)	Wt. (kg.)	Ht. (cm.)	Wt. (kg.)	Ht. (cm.)	Wt. (kg.)	Ht. (cm.)	Wt. (kg.)
A 16	3–6	97.2	15.21	....	....	100.3	16.34	102.2	16.34	5.0	1.13
A 15	4–7	105.4	19.64	108.0	19.75	109.9	20.43	111.1	20.48	5.7	.84
I 11	4–0	98.4	19.64	99.7	20.88	101.0	21.88	103.5	20.52	5.1	.88
C 4	6–6	111.1	19.30	113.7	19.86	114.3	20.09	....	....	3.2	.79
C 5	4–4	94.6	13.96	97.2	13.73	97.8	14.47	....	....	3.2	.51
K 5	5–4	....	....	104.8	16.46	107.3	17.31	109.2	17.37	4.4	.91
O 5	3–11	105.4	21.34	112.4	22.25	114.3	23.15	116.8	23.04	11.4	.70
		Oct. 1959		Jan. 1960		Apr. 1960		Jul. 1960			
A 16	4–6	103.9	17.03	104.4	17.37	....	....	108.0	18.27	4.1	1.24
A 15	5–7	113.0	21.34	113.0	22.36	114.6	22.70	117.0	24.29	4.0	2.95
I 11	5–0	103.9	21.22	105.9	21.85	108.2	22.47	110.0	22.25	6.1	1.03
C 4	7–5	116.8	20.77	118.1	21.45	119.4	22.25	120.9	22.59	4.1	1.82
C 5	5–3	99.0	14.98	100.0	15.44	102.9	15.89	103.1	17.48	4.1	2.50
K 5	6–3	111.1	18.39	111.1	19.30	114.0	20.43	....	....	2.9	2.04
O 5	4–10	118.7	23.61	118.7	25.20	....	....	....	25.65	0.0	2.04

table 17

GROWTH OF CHILDREN ENTERING EXPERIMENTAL SCHOOL IN 1959

Group III

Child	Age yrs.-mos.	Oct. 1959		Jan. 1960		Apr. 1960		Jul. 1960		Total gains	
		Ht. (cm.)	Wt. (kg.)	Ht. (cm.)	Wt. (kg.)	Ht. (cm.)	Wt. (kg.)	Ht. (cm.)	Wt. (kg.)	Ht. (cm.)	Wt. (kg.)
A 17	3–5	92.0	14.98	92.2	14.70	94.8	14.64	....	....	2.8	0.00
E 3	6–11	111.3	19.18	112.0	19.30	114.7	20.43	116.0	20.88	4.7	1.70
E 4	5–9	102.6	16.00	104.6	16.91	107.0	17.48	109.0	17.82	6.4	1.82
G 8	6–4	111.5	23.15	111.5	23.49	....	....	115.2	24.18	3.7	1.03
G 9	4–6	101.5	16.68	103.0	17.03	105.0	17.82	106.8	18.50	5.3	1.82
L 8	3–2	97.4	16.80	97.5	16.68	101.0	17.37	102.7	17.93	5.3	1.13
L 7	5–9	108.1	19.98	108.1	21.00	111.0	21.79	....	....	2.9	1.81

table 18

GROWTH RATES OF CHILDREN

Group I

Child	Age yrs.-mos.		S	dS	MS	dA	dS/dA	dS/dA/MS	x100
D 6	4–0	s1	97.8	1.9	98.75	.345	5.5	.055	5.5%
		s2	99.7						
D 4	6–5	s1	108.0	1.9	108.95	.345	5.5	.050	5.0%
		s2	109.9						
D 5	5–5	s1	103.5	2.5	104.75	.345	7.2	.069	6.9%
		s2	106.0						
F 6	5–4	s1	106.7	1.3	107.35	.345	3.8	.034	3.4%
		s2	108.0						
F 7	5–4	s1	104.1	1.9	105.05	.345	5.5	.052	5.2%
		s2	106.0						
I 10	6–2	s1	114.9	3.8	116.8	.345	11.0	.094	9.4%
		s2	118.7						
I 9	7–6	s1	120.7	3.8	122.6	.345	11.9	.090	9.0%
		s2	124.5						
J 6	7–5	s1	120.7	2.5	121.95	.249	10.0	.082	8.2%
		s2	123.2						
J 7	7–1	s1	121.9	0.7	122.25	.345	2.0	.016	1.6%
		s2	122.6						
O 4	6–2	s1	116.8	3.2	118.4	.345	9.3	.071	7.1%
		s2	120.0						

Explanation of calculation (Bayer & Bayley: *Growth Diagnosis*, p. 65)

s_1 = First recording
s_2 = Second recording
S = Stature in centimeters
dS = Difference in height
MS = Mean stature
dA = Elapsed time (figured in decimals of 1 year)

$$\text{Growth rate} = \frac{dS/dA}{MS} \times 100$$

table 19

GROWTH RATES OF CHILDREN

Group II

Child	Age yrs.-mos.		S	dS	MS	dA	dS/dA	dS/dA/MS	x100
A 16	3–6	s_1	97.2	3.1	98.75	.348	8.9	.090	9.0%
		s_2	97.3						
A 15	4–7	s_1	105.4	2.6	106.7	.348	7.5	.070	7.0%
		s_2	108.0						
I 11	4–0	s_1	98.4	1.3	99.05	.348	3.7	.037	3.7%
		s_2	99.7						
C 4	6–6	s_1	111.1	2.6	112.4	.348	7.5	.067	6.7%
		s_2	113.7						
C 5	4–4	s_1	94.6	2.6	95.9	.348	7.5	.078	7.8%
		s_2	97.2						
K 5	5–6	s_1	103.5	3.8	105.4	.334	11.4	.108	10.8%
		s_2	107.3						
O 5	3–11	s_1	105.4	7.0	108.9	.263	26.6	.244	24.4%
		s_2	112.4						

Explanation of calculation (Bayer & Bayley: *Growth Diagnosis*, p. 65)

s_1 = First recording
s_2 = Second recording
S = Stature in centimeters
dS = Difference in height
MS = Mean stature
dA = Elapsed time (figured in decimals of 1 year)

$$\text{Growth rate} = \frac{dS/dA}{MS} \times 100$$

table 20

GROWTH RATES OF CHILDREN

Group III

Child	Age yrs.-mos.		S	dS	MS	dA	dS/dA	dS/dA/MS	x100
A 17	3–5	s1	92.0	.2	92.1	.282	.7	.007	.7%
		s2	92.2						
E 3	6–11	s1	111.3	.7	111.65	.282	2.5	.022	2.2%
		s2	112.0						
E 4	5–9	s1	102.6	2.0	103.6	.282	7.1	.068	6.7%
		s2	104.6						
G 8	6–4	s1	111.5	0	111.5	.282	......	....	0
		s2	111.5						
G 9	4–6	s1	101.5	1.5	102.25	.282	5.3	.051	5.1%
		s2	103.0						
L 8	3–2	s1	97.4	.1	97.45	.282	.3	.003	.3%
		s2	97.5						
L 7	5–9	s1	108.1	.9	108.55	.282	3.2	.029	2.9%
		s2	109.0						

Explanation of calculation (Bayer & Bayley: *Growth Diagnosis*, p. 65)

s_1 = First recording
s_2 = Second recording
S = Stature in centimeters
dS = Difference in height
MS = Mean stature
dA = Elapsed time (figured in decimals of 1 year)

$$\text{Growth rate} = \frac{dS/dA}{MS} \times 100$$

table 21

FOOD EXPENDITURES OF FAMILIES REPORTING, 1958-59

Family	Number supported by family income	Weekly income	Average food cost per week	Cost per person per week	Percent of income for food
Cummings	6	$ 50.00	$ 16.50	$ 2.75	33
Frost	8	25.00*	16.50	2.06	66
Inman	9	96.00	35.00	3.90	36
Jackson	7	100.00	27.00	3.85	27
Nelson	10	80.00	35.00	3.50	43
Average				$ 3.21	41

***Tenant farmer.**

table 22

FOOD EXPENDITURES OF FAMILIES REPORTING, 1959-60

Family	Number supported by family income	Weekly income	Average food cost per week	Cost per person per week	Percent of income for food
Alford	8	$ 90.00	$ 42.50	$ 5.32	47
Cummings	6	50.00	27.50	4.58	55
Edgar	7	80.00	16.50	2.36	21
Frost	8	80.00	25.00	3.12	31
Grant*	7	....	....	....	....
Inman	9	96.00	31.75	3.53	33
Jackson	7	100.00	27.50	3.93	27.5
Kermit	5		....	....	....
Lawrence	9	Veterans' relief	25.00	2.77	Food stamps
Average				$ 3.66	35.8

***Foster parents: Income is average or above.**

table 23

NUTRIENTS IN FOOD PURCHASES OF FAMILIES REPORTING IN 1958-59, AS PERCENTAGES OF DAILY RECOMMENDED ALLOWANCES OF THE NATIONAL RESEARCH COUNCIL

Family	Calories	Protein	Calcium	Iron	Vit. A	Thiamine	Ribo-flavin	Niacin	Ascorbic acid
Cummings	126	113	70	130	191	138	98	143	40
Frost	85	99	81	22	118	103	101	27	96
Inman	83	97	60	111	341	95	100	100	58
Jackson	94	111	198	100	67	167	103	91	22
Nelson	63	85	33	56	67	156	75	122	89
Average	90	101	88	84	157	132	95	97	61

Note: The sources of vitamin D varied so greatly from day-to-day as to make calculation meaningless.

table 24

NUTRIENTS IN FOOD PURCHASES OF FAMILIES REPORTING IN 1959-60, AS PERCENTAGES OF DAILY RECOMMENDED ALLOWANCES OF THE NATIONAL RESEARCH COUNCIL

Family	Calories	Protein	Calcium	Iron	Vit. A	Thiamine	Ribo-flavin	Niacin	Ascorbic acid
Alford	92	108	85	96	105	115	103	104	29
Cummings	196	104	50	48	72	91	91	109	24
Edgar	102	101	85	112	91	86	106	81	90
Frost	66	77	36	79	104	79	59	79	92
Grant*	165	211	298	150	164	174	118	165	136
Inman	108	93	77	93	33	117	107	64	49
Jackson	40	44	42	39	79	65	42	33	39
Kermit	182	206	134	214	209	108	197	88	42
Lawrence	83	83	52	105	162	92	86	97	45
Average	115	114	95	121	125	103	101	91	61

* Foster family: Data omitted in calculating means.

Note: The sources of vitamin D varied so greatly from day-to-day as to make calculation meaningless.

table 25

DAILY NUTRITIONAL INTAKE OF CHILDREN AT HOME

Child	Age group (yrs.)	Calories	Protein (gm.)	Fat (gm.)	Carbo-hydrate (gm.)	Calcium (gm.)	Iron (mg.)	Vitamin A (IU)	Thiamine (mg.)	Ribo-flavin (mg.)	Niacin (mg.)	Ascorbic acid (mg.)
A 15	4 to 6	1683	63	103	234	.89	6.0	1397	.94	1.6	10.7	18
A 17	"	1236	47	62	123	.69	4.0	1192	.68	1.4	7.8	15
A 16	"	1293	49	55	120	.79	4.4	1237	.71	1.4	7.5	16
C 5	"	819	36	35	90	.34	5.5	1582	.52	.8	5.0	73
E 4	"	1090	47	46	129	.96	4.8	5339	.66	1.5	7.1	18
L 7	"	1779	45	63	266	.57	11.1	8307	.60	.7	10.7	73
L 8	"	2131	66	103	241	1.60	8.6	3919	.99	2.5	9.8	54
I 11	"	2403	90	108	252	1.63	8.4	4754	1.18	2.3	8.7	92
Average		1554	55	72	182	.93	6.6	3466	.79	1.5	8.4	45
C 4	7 to 9	907	38	39	103	.35	6.0	1727	.61	.8	14.0	72
E 3	"	1044	42	41	131	.92	4.3	5286	.65	1.4	6.3	18
Average		976	40	40	117	.635	5.2	3507	.63	1.1	10.2	45

Note: The sources of vitamin D varied so greatly from day-to-day as to make calculation meaningless.

table 26

DAILY NUTRITIONAL INTAKE OF CHILDREN WITH LUNCH AND MILK SUPPLEMENT AT SCHOOL

Child	Age group (yrs.)	Calories	Protein (gm.)	Calcium (gm.)	Iron (mg.)	Vitamin A (IU)	Thiamine (mg.)	Riboflavin (mg.)	Niacin (mg.)	Ascorbic acid (mg.)
A 15	4 to 6	2038	118	1.5	8.98	20,960	1.2	3.6	17.8	48
A 17	"	2136	77	1.4	10.9	24,299	1.3	3.6	13.4	48
A 16	"	1566	76	1.5	5.0	2,917	1.0	3.2	9.9	40
C 5	"	1537	76	.9	10.0	16,322	.8	2.5	13.3	52
E 4	"	1775	79	1.2	9.5	21,895	.9	3.6	13.3	40
L 7	"	1646	71	1.3	11.8	28,948	1.0	3.9	11.7	48
L 8	"	1556	74	1.3	9.5	27,301	.9	3.8	12.5	49
I 11	"	2326	110	2.0	16.2	30,632	1.7	6.7	19.5	59
Average		1623	85	1.4	10.23	21,659	1.1	3.9	13.9	48
C 4	7 to 9	1641	82	1.2	12.2	16,763	.85	3.0	23.32	52
E 3	"	1831	82	1.3	9.6	21,958	.85	2.9	13.5	38
Average		1736	82	1.3	10.9	19,361	.85	2.9	18.4	45

Note: The sources of vitamin D varied so greatly from day-to-day as to make calculation meaningless.

table 27

IQ CHANGES IN CHILDREN WITH ABNORMAL EEG'S

Child	Age	First IQ	Last IQ	Interval (yrs.)	Increment	Positive history and/or exam	Negative history and exam
A 16	3	62	113	3	+51	X	
A 17	3	67	114	2	+47	X	
O 5	3	81	85	4	+ 4	X	
A 15	4	68	90	3	+22	X	
I 11	4	77	96	3	+19	X	
F 7	4	85	102	4	+17	X	
P 3	4	79	84	5 months	+ 5	X	
B 6	4	70	74	3	+ 4	X	
F 6	4	89	92	3	+ 3	X	
D 5	4	89	90	3	+ 1		X
D 6	4	105	101	2	− 4	X	
Average		79	94		+15		
L 7	5	69	91	2	+22		X
I 10	5	65	86	5	+21	X	
E 4	5	64	82	2	+18	X	
D 4	5	88	102	3	+14		X
C 4	5	55	63	4	+ 8	X	
N 6	5	77	82	3	+ 5	X	
N 7	5	89	91	3 months	+ 2	X	
K 5	5	76	72	2	− 4	X	
I 9	6	71	80	3	+ 9	X	
Average		73	83		+10		

table 28

IQ CHANGES IN CHILDREN WITH NORMAL EEG'S

Child	Age	First IQ	Last IQ	Interval (yrs.)	Increment	Positive history and/or exam	Negative history and exam
B 5	2	66	75	2	+ 9		X
A 18	3	73	113	1	+40	X	
L 8	3	83	116	2	+33		X
M 2	3	62	89	2	+27	X	
H 6	3	72	98	1	+26	X	
H 7	3	78	92	1	+14	X	
C 5	3	85	84	3	− 1		X
G 9	4	80	113	2	+33	X	
H 5	4	79	105	1	+26	X	
Average		75	98		+23		
J 6	6	78	99	3	+21	X	
G 8	6	64	79	2	+15		X
B 5	6	63	72	3	+ 9		X
J 7	6	68	75	4	+ 7		X
O 4	6	82	84	3	+ 2		X
E 3	7	70	88	2	+18		X
Average		71	83		+12		

table 29a

AVERAGE IQ CHANGES IN CHILDREN WITH ABNORMAL EEG'S

Age	N	First IQ	Last IQ	Increment
2–4	11	79	94	15
5–7	9	73	83	10

table 29b

AVERAGE IQ CHANGES IN CHILDREN WITH NORMAL EEG'S

Age	N	First IQ	Last IQ	Increment
2–4	9	75	98	23
5–7	6	71	83	12

table 29c

AVERAGE IQ CHANGES IN CHILDREN WITH NORMAL AND ABNORMAL EEG'S

Age	N	First IQ	Last IQ	Increment
2–4	20	77	96	19
5–7	15	72	83	11

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